Emotion and Trauma: Underlying emotions and trauma symptoms in two flooded populations

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Abstract

Flood literature presents an inconsistent account of post-disaster distress; debating whether distress is pathological or normal and attempting to understand distress in terms of disaster variables. The literature therefore provides little guidance as to how to formulate difficulties in a clinically meaningful way reflective of individual's experiences. The SPAARS model is presented as a model by which to reconcile these differences and quantitative support for its concepts were studied within two flooded samples.

Participants who were flooded in Carlisle in 2005 (n=32) and participants flooded in Morpeth in 2008 (n=29) provided two samples at different stages in flood recovery and facilitated a quasi-longitudinal sample for comparison of flood-related distress over time. Participants were asked to complete a survey pertaining to: basic emotions experienced during the flood event, basic emotions experienced after the flood, Impact of Events Scale-Revised (IES-R), Regulation of Emotions Questionnaire (REQ) and the Trauma Symptom Inventory (TSI).

Findings suggest that a third of participants who were flooded experienced clinically significant levels of distress, even after four years. Both samples showed higher levels of impact symptoms on the IES compared to symptoms on the TSI. Anxiety and anger were significant in reported flood experiences both during and after the flooding. Flood-related variables and previous experiences had no effect on increased distress but greater use of internal-dysfunctional emotion regulation strategies was related to increased impact and distress symptoms. Study findings and the SPAARS model are discussed in relation to previous flooding and PTSD literature, as well as clinical implications for the treatment of post-disaster distress and for the future management of flood-affected populations.

Introduction

1.0 Disasters and Definitions

Exposure to traumatic events is statistically more common than most people realise and a substantial body of literature into their effects has been amassed over the past 25 years (Neria *et al.*, 2008). More than two-thirds of the general population will be exposed to traumatic events within their lifetime (Breslau *et al.*, 1998) and studies suggest that up to one-fifth of Americans may experience traumatic events in the USA in any given year (Kessler *et al.*, 1995; Norris, 1992; Resnick *et al.*, 1993). Of particular interest are the effects of disaster events on those exposed to them (Norris *et al.*, 2004).

Traumatic events constitute a variety of experiences and the trauma literature unfortunately does not provide a consistent distinction between individual traumatic events and disasters (Quarantelli, 1995). Neria *et al.* (2008) suggest that disasters "are best considered as being collectively experienced or mass traumas" (p.474) and Tierney *et al.* (2001) suggests that they are events that are, by definition, extremely harmful and disruptive. More specifically, Neria *et al.* (2008) outline that "definitions should account for at least two dimensions: scale and outcome. If an incident is large in scale (affecting a considerable number of people) regardless of loss of life, and its consequences are 'significant' (i.e. resulted in quantifiable mental and/or physical health outcomes)" (p.474) then it can be considered as a 'disaster'.

1.1 Natural Disasters

Although the majority of disaster research has focussed upon studying intentional human-caused events, such as mass-violence or terrorism, literature on the effects of natural disasters specifically has

increased dramatically over the past 25 years (Norris *et al.*, 2004). Natural disasters understandably share many features of disasters caused by human action or technological failures (Neria *et al.*, 2008). However, disasters caused by environmental events can be seen as being distinctly different in a number of ways.

Firstly, natural disasters are by far the most commonly occurring of all disaster events (Neria *et al.*, 2008). They massively outnumber both human and technological disasters in their frequency and geographic distribution across the world (Brunello *et al.*, 2001) and they tend to affect wider geographic areas at their time of occurrence (e.g. over an entire region of a country, compared with smaller and more specific affected groups of human and technological disasters). Consequently, natural disasters affect more heterogeneous populations, involving victims both directly and indirectly (Carr *et al.*, 1995; Shannon *et al.*, 1994; Thompson *et al.*, 1993). Nevertheless, the distribution of disasters occurring worldwide varies considerably with certain geographical areas being exposed to more frequently occurring large-scale traumatic events than others (Brunello *et al.*, 2001; Kessler, 2000).

2.0 Post-disaster impact in detail

The impact and consequences of disaster experiences include a wide range of psychopathology (Neria *et al.*, 2006; Norris *et al.*, 2002). Within the literature, posttraumatic stress disorder is the most commonly studied post-disaster psychopathology (Galea *et al.*, 2005; Norris *et al.*, 2002), generally because it is considered to be "among the most common adverse consequences for which disaster victims are at risk" (Norris *et al.*, 2004, p.283) and likely to be the "central pathology after such events" (Neria *et al.*, 2008, p.467).

2.1 Posttraumatic Reactions

Reviews of the literature report evidence of PTSD in 68 per cent of all natural disaster samples (Norris *et al.*, 2002) although the prevalence of PTSD documented after natural disasters is often lower than for other disaster events (Galea *et al.*, 2005; Norris *et al.*, 2002). Literature varies regarding the degree of reported prevalence, ranging from 3.7 per cent (Canino *et al.*, 1990) to 60 per cent (Madakasira & O'Brien, 1987) within the first two years after natural disasters. The bulk of the literature report estimates within the lower half of this range (Liu *et al.*, 2006; Norris *et al.*, 2004; Parslow *et al.*, 2006), which is reflected in PTSD prevalence of 32 per cent reported following Mexico City earthquake (de la Fuente, 1990) and 29 per cent following Hurricane Paulina and Hurricane Katrina (Manuel, 2006; Norris *et al.*, 2001). However despite reduced prevalence compared to other types of events, the literature suggests that six months post-event, the prevalence of "disaster-specific PTSD" in fact remains strikingly high (Norris *et al.*, 2004, p.289).

2.2 Additional post-event difficulties

Although PTSD has been the general focus within the literature, natural disasters are also associated with increased prevalence of "severe psychiatric symptoms, including depression, somatic complaints and nightmares" (Bland *et al.*, 1996, p.18). Following floods in California in 1997, Waelde, *et al.* (1998) also noted symptoms of acute stress within the affected population as well as PTSD. In fact, 38 per cent of those affected by a flood in the Midwest of the United States in 1993 were reported to meet criteria for other psychiatric disorders (McMillen *et al.*, 2002) with studies suggesting that depression in particular is common after such events (Bolton *et al.*, 2000; de la Fuente, 1990, Fullerton *et al.*, 1999; Lima *et al.*, 1991; McFarlane & Papay, 1992; Norris *et al.*, 1999) "often occurring in combination with PTSD" (Norris *et al.*, 2004, p.283). Indeed one in four of those with diagnosable

PTSD following hurricane experience also met criteria for major depressive disorder (Norris *et al.*, 2004).

2.3 Focus on Posttraumatic Stress Symptoms

When focussing on posttraumatic stress symptoms experienced, studies describe that symptoms of PTSD begin soon after the event (North *et al.*, 1997; Waelde *et al.*, 2001). Disaster victims may continue to experience these impacts long after the event (Steinglass & Gerrity, 1990; Bland *et al.*, 1996; Tunstall *et al.*, 2006), which may persist for years after a disaster which is particularly severe (Green *et al.*, 1990; Yule *et al.*, 2000). Other literature suggests there may also be delayed onset of symptoms (Green *et al.*, 1990). A year after disaster events, the degree of recovery still occurring was considered so substantial that Norris *et al.* (2004) suggested distress may be particularly prolonged in the aftermath of major disasters.

In all disaster samples, symptoms are reported to improve over time (Bland *et al.*, 1996) but it is suggested that such improvements differ depending upon the time points at which symptoms are followed-up. For example, some findings suggest that symptoms follow a linear decline (Carr *et al.*, 1997a*; 1997*b; van Griensven *et al.*, 2006); whereas other findings suggest that initial declines later stabilise (Bromet *et al.*, 1990; Carr *et al.*, 1997a; McFarlane, 1989). For example, a significant number of survivors of a dam-burst continued to show "clinically noteworthy psychopathology after 14 years" (Bland *et al.*, 1996, p.22) which could not be explained in terms of issues prolonging the event such as ongoing litigation. Furthermore, other evidence suggests symptoms fluctuate (Phifer *et al.*, 1988) and can also be found to increase at times after disasters (Neria *et al.*, 2008; Norris *et al.*, 2004; Wang *et al.*, 2000). However, discrimination of specific symptoms experienced might explain inconsistent findings. For example, following Hurricane Andrew in 1999, the prevalence of PTSD symptoms was reported to increase in those affected from 26 per cent to 29 per cent between 6 months and 30 months

after the event. But, when symptoms are specified more clearly, intrusion and arousal symptoms declined over this time, whereas avoidance symptoms increased in prevalence (Norris *et al.*, 1999). Importantly, increased avoidance yet reduced intrusions and hyperarousal might reflect a more normative or understandable response post-disaster than much of the PTSD literature allows for.

Despite reductions in symptom prevalence, studies show that even two years after an event, the prevalence of PTSD was much higher than the baseline for PTSD within the country and could remain significant enough to pose a public health concern (Brom *et al.*, 1990; Carr *et al.*, 1997; McFarlane *et al.*, 1989; Norris *et al.*, 2004). Indeed there was evidence in some samples that "if recovery had not occurred within 18 months or so, it was unlikely to happen at all"(Norris *et al.*, 2004, p.290) drawing a conclusion that following disasters "PTSD takes a chronic course in approximately one third of those who develop the condition" (Norris *et al.*, 2004, p.290).

2.4 Focus on disaster predictors

Although all disasters have the potential to generate significant distress in those affected, disasters within the developing world are considered to be "particularly problematic" (Norris *et al.*, 2004, p.283). Literature suggests that the location of disasters is a greater predictor of impact than disaster type (for example, flooding, or earthquakes) (Norris *et al.*, 2002). Comparable disasters in the United States compared with Latin America showed more severe effects in Latin America (Norris *et al.*, 2004) and studies have suggested that Latin American populations are at higher risk of developing PTSD than other survivor populations (Galea *et al.*, 2002; Perilla *et al.*, 2002). However it is suggested that "psychological health impacts are often more severe and longer lasting than physical health impacts, particularly within the Northern hemisphere" (Carroll *et al.*, 2009) although reviews suggest that "more research is required before such conclusions are reached with certainty" (Norris *et al.*, 2004 p.24) and it is recognised that disasters within different parts of the world are not readily comparable.

Much of the literature pertains to investigating specific aspects of disasters that might make one disaster more stressful than another, or more distressing to different sample groups. For example, evacuation or experience of financial loss due to an earthquake was related to greater distress than is found in the absence of these experiences (Bland *et al.*, 1996). In addition, women are suggested to be more affected by disasters than men (Shore, Tatum & Vollmer, 1986) and studies show that prevalence of PTSD is higher among people who are closer to the event than those in more distantly affected areas (Jordan *et al.*, 2004; Neria *et al.*, 2006; Schlenger *et al.*, 2002). However, disasters have also been reported to frequently affect populations that are not directly exposed to the event (for example, those who experience loss of family members or properties while they are absent) (Neria *et al.*, 2008). Evidence also suggests that mental health consequences within people indirectly-exposed to disasters may in fact be comparable or sometimes exceed that of those exposed directly (Galea *et al.*, 2005; Pfefferbaum *et al.*, 1999; Schlenger *et al.*, 2002; Silver *et al.*, 2002). In terms of the psychological impact of exposure, one review of post-disaster literature suggests fairly consistent estimates of PTSD among specific exposed groups within the first year, with prevalence in direct victims ranging between 30 per cent and 40 per cent; prevalence in rescue workers being lower, between 10 per cent and 20 per cent and prevalence in the general population being between 5 per cent and 10 per cent (Neria *et al.*, 2008).

However in terms of the effects of disaster-variables, Norris *et al.* (2004) suggested that few definitive conclusions could be reached. In attempting to predict the severity of traumas, much of the literature is directed at human-caused disasters, such as incidents of mass violence in which those affected are considered to be at greater risk of distress, than those affected by other types of disaster (natural or technological) (Norris *et al.*, 2004). In addition, the lower prevalence of PTSD noted in the aftermath of natural disasters (Norris *et al.*, 2002; Galea *et al.*, 2005), is considered to relate to "lower average dosage of exposure among people exposed to natural disasters" (Neria *et al.*, 2008, p.473) which is supported by findings of higher PTSD prevalence in those closer to the epicentre of disasters

compared to those further away (Basoglu *et al.*, 2004). However Norris *et al.* (2004) is quick to warn that the lower prevalence of PTSD is "often wrongly over-generalised to imply that natural disasters have minimal trauma potential" (p.284). Indeed higher prevalence estimates of PTSD are found in specific affected groups, such as clinical samples (Livanou *et al.*, 2002; Soldatos *et al.*, 2006) and populations in areas exposed to multiple disasters (Finnsdottir & Elklit, 2002; Najarian *et al.*, 2001). In addition, such prevalence might be lower but can be longer term, as noted by an earthquake-affected sample in Turkey where estimated PTSD prevalence was reported as 11.7 per cent even three years after the disaster (Onder *et al.*, 2006).

2.5 Limitation of focus on disaster variables

Many reviews maintain that there are "consistently documented determinants of the risk of PTSD, with measures of the magnitude of the exposure to the event, particularly the degree of physical injury, immediate risk to life, severity of property destruction and frequency of fatalities being especially predictive of high rates of PTSD" (Neria *et al.*, 2008, p.475). Studies consequently focus upon distinguishing distress based on predictors within the events, such as severity of losses (Bolin, 1985; Green, 1982) evacuation or damage (Norris *et al.*, 2004)

Norris *et al.* (2004) suggested that it is "reasonable to anticipate that natural disasters involving sudden onset, mass casualties and high trauma exposure are likely to be more pathogenic than natural disasters characterised by property damage and loss" (p.284). However, they also note that findings into the comparative impact of specific stressors within natural disasters (such as injury, threat to life, bereavement, loss or relocation) have been inconsistent and inconclusive in predicting distress (Norris *et al.*, 2004). Furthermore, other studies corroborate that making distinctions between disaster variables in predicting psychological impacts is not particularly informative (Bolin, 1985; Green, 1982). For example, Bland *et al.* (1996) report that distress is "not just a function of exposure to

tremors (in the case of earthquakes) but is dependent on the consequences of the disaster" (p.23). This broadening of focus may be more useful in providing explanations for the differences in sample responses; for example, why post-event prevalence of PTSD six months after an event was three times higher in one community than the prevalence in a nearby community that experienced the same disaster (Norris *et al.*, 2004).

2.6 Variations / Inconsistencies

Although a broader disaster focus might seem like a sensible suggestion, Norris *et al.* (2004) highlights that disasters come in a "myriad of forms and severities" (p.284). Disasters are therefore vastly heterogeneous experiences for those affected, making it difficult to draw parallels between events which are often as different as they are similar in nature. In addition, the literature is complicated by the fact that some populations have repeated experiences of the same type of disaster (Bland *et al.*, 1996).

There is some evidence that experience of previous trauma increases the risk of developing posttraumatic stress symptoms following subsequent exposure to traumatic events. For example, greater distress after an earthquake was noted in those who experienced damage and distress in an earlier earthquake compared with those with no previous earthquake-related damage or distress (Bland *et al.*, 1996). In this study, prior disaster experience was considered to "arouse a level of distress significant enough to preclude additional arousal with the second experience" (Bland *et al.*, 1996, p.22). Conversely however, Norris & Murrell (1988) noted an 'inoculation effect', in that anxiety in a sample affected by flooding in Kentucky in 1984 was reduced if they had experience of a prior flood in 1981 compared to those flooded for the first time in 1984. Consequently, previous flood experience appeared to protect individuals from distress in subsequent flood experiences but findings into the impact of previous disaster experience are entirely contradictory.

Both of these arguments unfortunately rely too much on perceiving disasters as predictable events with predictable effects. Furthermore they focus exclusively upon objective variables without considering that both effects could be entirely valid but under different circumstances. For example, how valid is it to directly compare responses to flooding with those experienced during earthquakes? Although both are potentially life-threatening, flooding may be marginally more predictable in nature. Within flood events, the greatest danger presents itself by flood waters underfoot and routes to higher areas would be the most obvious method of reaching safety. It is therefore plausible that each exposure would lead to more effective coping though experience of escape methods. By comparison, however, the potential for escape during earthquakes is more dangerous as both open ground and built up areas present equivalent threats to physical integrity; for example, by falling into moving crevices or from buildings collapsing. Consequently, earthquakes are potentially as dangerous and novel with each recurrent event, reducing the opportunity for individuals to learn better ways of escaping. Individuals may therefore experience as much fear (if not more) in a subsequent earthquake as in their first experience of this event. Unfortunately this demonstrates the weakness of the literature's focus upon objective predictors of distress. By instead considering the meaning of the particular circumstances for those affected, or the consequences of particular types of events it is possible that contradictory findings may all be valid but under different circumstances.

2.7 Specific disaster focus

As discussed, natural disasters include a variety of events such as earthquakes, floods, bush fires, tsunamis and volcanic eruptions. They vary significantly from one type to another and occur with greater frequency within particular parts of the world, making it difficult to draw parallels between events in trying to predict impact and distress. Countries most affected by natural disasters tend to

be within the developing world, with poorer prognosis for those affected related to the lack of infrastructure surrounding them (Neria *et al.*, 2008). However, this increased frequency in some areas also lends itself to differences in the expectations of natural disasters within affected populations and their greater acceptance of disaster occurrence. Consequently, different types of disaster pose different challenges depending upon the population as well as the event. As such, focussing upon one specific type and location of disaster can be valuable to maintain clarity in the face of these differences within the literature. As such, this study aims to focus specifically on the occurrence of flood disasters occurring exclusively within the United Kingdom.

3.0 Flooding

Flooding is the most frequently reported and costly of all natural disasters that occur worldwide (Hewitt, 1997). Importantly, the extent of flooding and its impacts are expected to increase over the next century due to global warming (IPCC, 2007; Stern & HM Treasury, 2007). In addition, regional changes in flood distribution may result in areas which have not been previously affected becoming affected for the first time (Few, 2006). Unfortunately, communities have come to expect to be protected from flooding, believing it will not happen to them, making them less aware of the potential risks and the likely health impacts of living within floodplains (Tapsell & Tunstall, 2008).

Previously in the United Kingdom, river floods have typically been small in scale and short-lived. However, since 1998 there have been more frequent incidents of extreme events and severe flooding year on year (Tapsell & Tunstall 2008). The most notable of these incidents in recent years pertain to flooding in Boscastle (2004), Carlisle (2005), Hull and Tewkesbury (2007) and Morpeth (2008) (Environment Agency, 2005a; 2005b). Nevertheless it is estimated that two million properties and four million people within the UK are considered to be at risk from river, estuary or coastal flooding (Evans *et al.*, 2004). Unfortunately, increased vulnerability to pluvial, groundwater and sewer

flooding within urban areas may significantly increase this risk (Tapsell & Tunstall, 2008) making potential flooding a serious public health consideration.

Despite their increasing frequency, the systematic research on the health outcomes related to flooding is limited (Few *et al.*, 2004; Hajat *et al.*, 2003), however clinical interest in natural disasters is increasing (Fewtrell & Kay, 2008), mainly due to the perception that climate change leads to an increase in the occurrence and magnitude of extreme flood events (Evans *et al.*, 2004). Fortunately, research into health effects associated with flooding has increased dramatically in recent years (Hajat *et al.*, 2003; Ohl & Tapsell, 2000; Tapsell & Tunstall, 2003). This is valuable in understanding the consequences of flooding as the devastation to properties is usually obvious but the "impacts where drowning and physical injury do not occur can be more subtle" (Fewtrell & Kay, 2008, p.446).

3.1 Health effects of flooding

The first investigation into flood impact in the UK followed the 1968 flooding in Bristol (Bennett, 1970). The report documented the flood's specific impact on health, highlighting that primary care attendance rose by 53 per cent and referrals and admissions to hospitals more than doubled after the flood. However, despite increased research interest in these issues, a review on health consequences of flooding in Europe concluded that flood-associated health impacts were still poorly defined (Hajat *et al.*, 2003).

Literature suggests that flooding may potentially impact on health in a number of ways, with the most serious being the obvious risk of death from drowning or serious injury sustained as a result of the disaster (Tunstall *et al.*, 2006). More common health effects pertain to minor injuries (Manuel, 2006; Schmidt *et al.*, 1993), diarrhoeal episodes or gastrointestinal illness (Reacher *et al.*, 2004; Wade *et al.*, 2004), respiratory disease (Franklin *et al.*, 2000) and a variety of psychological impacts (World

Health Organisation, 2003). In terms of perceptions of health impacts, the majority of respondents in a flooded sample (59 per cent) attributed physical health effects as related directly to the flood, in particular reporting physiological shock reactions either during or immediately after the flood (Tunstall *et al.*, 2006). Physical health problems which develop later are generally attributed to the effects of being exposed to cold and contaminated water or to living in cold damp conditions, as well as the physical effort and stress associated with the clean-up of their homes (Tapsell *et al.*, 1999; Tapsell & Tunstall, 2001; Tunstall *et al.*, 2006). Reporting of physical health effects within flooded populations typically reduces in the early weeks and months following floods and generally recedes over time (Tapsell & Tunstall, 2008), however there is a consensus that flooding is likely to contribute to both short and longer term physical and psychological health effects (Tunstall *et al.*, 2006). Indeed, it is the psychological impacts of flooding that are much more commonly reported once flooding has subsided (Tunstall *et al.*, 2006). In particular, it is the "so-called intangible impacts of flooding" (Tapsell & Tunstall, 2008, p.137) that can often be more significant to people than the event itself or its associated financial losses (Green *et al.*, 1994; Parker *et al.*, 1983).

3.2 Psychological Health effects

In common with other traumatic life events, flooding in the UK is associated with increased rates of mental health difficulties, particularly anxiety and depression (Bennet, 1970; Reacher *et al.*, 2004; Tapsell & Tunstall, 2006). Flooded households show a significantly increased risk of distress compared to non-flooded homes (Reacher *et al.*, 2004) even when non-flooded households are at risk of flooding (Tunstall *et al.*, 2006).

34 per cent flood-affected individuals have been identified as displaying clinically significant impairment in psychological health on the GHQ-12, which is higher than would be expected for the general population (Department of Health, 1998). Norris *et al.* (2001) also identified difficulties

associated with functioning and everyday life, including troubled family and social relationships, social disruption, occupational and financial stress, concerns about living conditions and about the condition of the wider community, as well as feeling an obligation to provide support to others. However, these stresses might be considered understandable and almost expected within a population enduring the circumstances associated with flooding. In most cases, these difficulties would not be considered pathological in nature. The literature also suggests that psychological consequences relating to personal loss of property after flooding are relatively short-lived (less than a year in duration) whereas exposure to more widespread community destruction is responsible for longer term impact (up to two years in duration) regardless of individual loss sustained (Phifer & Norris, 1989).

Literature consistently documents that, in the aftermath of floods, those affected experience physiological changes at times of distress, such as episodes of increased rainfall (Tapsell & Tunstall, 2008) and increased reactivity to stressors that are similar to the traumatic event (Beck & Franke, 1996), for example, reporting "increased anxiety when it rains heavily and when storms are forecast" (Tapsell & Tunstall, 2008, p.147). Associated behavioural changes are also widely reported by flood-affected populations, who show tendencies towards regular monitoring of river levels as well as moving possessions to different parts of their properties (such as upper floors or higher shelves), choosing more flood-resilient home furnishings and staying at home when heavy rain is forecast (Carroll *et al.*, 2009).

Furthermore, increased levels of stress attributed to flood experience are reported to be evident 18 months after the event, even following complete reinstatement of damaged property and removal of objective stressors (Tapsell & Tunstall, 2008). There is also a strong indication from the literature that displacement as well as loss is an important factor in flood-related psychological distress (Tapsell & Tunstall, 2008). In fact post-flood disruption in the UK has consistently been reported as the most

significant stressor from flooding (Green *et al.*, 1985; Parker *et al.*, 1983; Tapsell & Tunstall, 2001; Tunstall *et al.*, 2006). During the flood, perceived loss of control due to flooding is the most commonly reported reaction, with feelings of helplessness around the realisation that there is nothing that can be done to prevent the destruction (Horowitz, 1979). However, such loss of control also extends to experiences of reinstatement and future flood management. Experiencing difficulties in dealing with builders or insurance companies have been found to detrimentally affect the health outcomes of flooded individuals almost regardless of their initial flood experience (Tunstall *et al.*, 2006). Furthermore the literature describes that disputes with industrial companies is as significant in generating severe psychological stress as the initial disaster event (Erikson, 1976; 1994; Tapsell & Tunstall, 2008).

Importantly though, the literature cites that distress is not merely related to flood-specific variables, but is also influenced by individual factors such as gender and personal history of health or illness (Fordham, 1998; Galea *et al.*, 2005); accumulation of stressors (Verger *et al.*, 2003); lack of personal control (Massad & Hulsey, 2006; Reghr *et al.*, 2000) perceived and received social support or ability to cope with the event (Declerq & Palmans, 2006; Ozer *et al.*, 2003; Peres, Mercante & Nasello, 2005) and resilience (Bonanno, 2004).

3.3 Importance of perception

Studies suggest that the perception of natural disasters differs across the world and is an important consideration for understanding disaster-related distress. For example, the risk of fire in regions of Australia that are frequently affected by bushfires appears to be perceived as inevitable, with populations recognising that nature is always changing (Cox & Holmes, 2000). However, this perception is not shared in flooded populations in the UK where natural disasters objectively occur

less frequently and where the perception is that "nature, even if not standing still, could be managed" (Tapsell & Tunstall, 2008, p.149).

In reference to flood perceptions, it is necessary to consider how perceptions of disaster events might be influenced by distress experienced by those affected. Unfortunately, there is little consideration of this within the flood literature and it can be difficult to interpret the 'reality' of experiences, distressing though they are, in the absence of objective evidence about individual's circumstances. For example, the literature reports considerable fear among flood-affected individuals that homes were contaminated from raw sewage in the flood waters and that "the smell lingering for months after homes were back in order" (Tapsell & Tunstall, 2008, p.150). Despite being a legitimate and understandable concern, it is difficult to know whether this was an accurate reflection of reality or a perception related to flood distress. In the aftermath of flooding, homes are often reinstated over a year after floods have subsided. This often involves buildings being gutted to their foundations, washed and disinfected before all internal constructions are replaced and homes are decorated and furnished. Although it is possible for contractors to cut corners, it is difficult to know whether sewage contamination could still linger over this length of time, or whether understandable concerns and increased anxiety in some individuals might make this 'smell' return as intrusive phenomena. When working clinically with distressed individuals, practitioners would typically consider the presence of corroborating evidence for the validity of perceptions, and therefore not questioning this within flooded samples starts to limit the generalisability of findings to clinical work within these populations.

4.0 Specific Case Studies

The literature presents a small number of qualitative studies into the effects of specific floods upon the local population, for example in Carlisle (Carroll *et al.*, 2009) and Banbury and Kidlington (Tapsell

& Tunstall, 2008). Their particular relevance pertains to the fact that previous literature "identified the events that triggered anxiety and stress but neglected the underlying psychological processes and deeper aspects of the impact upon mental health" (Carroll *et al.*, 2009, p.540). Consequently, reviewing these studies presents the personal impacts of flooding in illuminating detail, highlighting the most salient points reported by those affected.

4.1 Specific features of flooding – personal accounts

Initial flood impacts pertain to "surprise at the speed, power and depth of the flood waters and length of time it was in properties" (Carroll *et al.*, 2009 p.542) with "the shock of seeing flood water enter homes and being helpless to prevent it, which had a significant impact on some participants especially if they were alone at the time of the flood" (Tapsell & Tunstall, 2008, p.142). On this issue, participants provide vivid descriptions of their experiences:

"I woke up, stepped out of bed into a foot of water... the windows were jammed [shut], I couldn't open the door, it was terrifying" (Tapsell & Tunstall, 2008, p.142);

"Water rushing down the road like Niagara Falls" (Carroll *et al.*, 2009, p.542)

"It was like the Titanic... listening to things falling over and falling out of cupboards" (Carroll *et al.*, 2009 p.542).

Experiences are described in strong emotional terms, as people felt "horrified, terrified, never being so frightened in their lives; a genuine fear that lives were in danger" (Carroll *et al.*, 2009, p.542) and fears about contaminants from flooded sewers within their homes (Tapsell & Tunstall, 2008).

By highlighting these descriptions, Carroll *et al.* (2009) makes a valuable contribution in focusing upon the importance of individual experiences rather than reliance upon discriminating distress based upon objective flood variables as found in other flood literature. Furthermore, most retrospective studies forget that at the time of researching events, the outcome is already known (for example, that damage was limited to property and there was no loss of life) such that it can be easy to minimise the fear experienced at the time. Consequently, Carroll *et al.* (2009) provide a valuable reminder that those affected by flooding experience greater fear, uncertainty about severity of the outcome and the feeling of danger during the first moments of the event than some studies allow for. In addition, vivid accounts by those affected highlight that much of the terror felt at the time does not merely pertain to the water entering properties as most researchers assume, but is also related to aspects of the experience which receive little discussion within the flood literature. For example, within Carlisle, at the time of flood water entering properties, power was cut to the entire city, making communication with the outside world and with emergency services impossible. Without radio contact, those affected did not know how to raise help, receive information about the severity of the event or get advice for what to do. Families experienced difficult physical circumstances in the depth of winter, with homes rapidly losing heat, filled with freezing sewage-contaminated water and many people without food or clean water for over 24 hours. Initially water receded but news spread that the flood would return at the next high tide but with greater force and height. Consequently people abandoned their homes in a panic-stricken exodus leaving a very anxious few with nowhere else to go, who remained in their homes waiting for the event to worsen with nothing they could do and no means of raising help. For these individuals, looting and burglaries became a problem. Criminal gangs (some travelling from other counties to prey on abandoned homes), entered properties by force regardless of whether they were inhabited or not. Individuals watched as neighbours' homes were entered by force, uncertain if theirs would be next, whether they should intervene, whether looters were armed and unable to contact the police for assistance: all while awaiting a second flood which might be more dangerous than the first. Consequently, when detail of

events are considered in greater depth, it is clearer how much of the threat presented at the time was due to factors other than water in people's homes. Concerningly, little of this detail receives consideration within the literature and even less is considered when researchers and clinicians anecdotally describe what they think it might be like to be flooded.

4.2 Stresses in the aftermath

Flood literature tends to focus upon the extent of financial loss sustained as a predictor of distress after flooding. However, Carroll *et al.* (2009) reminds us that the degree of damage to the structure of properties "often required larger restoration projects than first thought" (Carroll *et al.*, 2009, p.542), with many respondents expressing that losing the fundamental fabric of home, the floors, walls and kitchen is a far bigger problem than losing 'things'. Nevertheless, loss of personal possessions, particularly those of sentimental value, inherited through family or which couldn't be replaced, such as photos or paintings their children had made were the most acute losses which caused the greatest distress (Carroll *et al.*, 2009).

Within flooded samples, some families stay within their homes while reinstatement work is conducted, for a variety of reasons, and often against the advice of insurance companies or builders. Although this allows some people to feel more in control of monitoring the situation, many live for over a year with inadequate washing, cooking and heating facilities, "within unhealthy and unsafe conditions, with dust, noise and half-gutted cold dirty homes" (Carroll *et al.*, 2009, p.542). In addition, insurance companies often proved to be insensitive to people's circumstances, forcing people to make unwanted decisions and preventing them restoring their homes as they would choose to. Cleaning companies often entered properties and destroyed property unnecessarily and without permission, increasing the sense of lost control and loss of possessions. Furthermore, building contractors were found to be exploitative of flood-affected families, cutting corners, employing illegal immigrants

without adequate training and using properties like public conveniences (Tapsell & Tunstall, 2008), with employees using other homes' toilet facilities, and even sleeping in the beds upstairs. Poignantly, within similar studies, people under these circumstances report being 'in their home' but not feeling 'at home' (Dovey, 1985) increasing their sense of overall loss to aspects others than possessions.

Carroll *et al.* (2009) also discusses that "staying in their own homes in these circumstances may be seen as a reflection of the importance, investment and attachment to home. Home was not seen in the same light as prior to the flood. The relationship to home had been changed – home as a place of privacy or comfort or security was breached" (p.542). Although this can be the case for some individuals, anecdotally many of those who remain at home report doing so out of necessity; for example, due to the shortage of alternative accommodation, being unable to accommodate pets elsewhere, and was consequently no reflection of attachment to the property. In addition, Carroll *et al.* (2009) do not accommodate for anecdotal evidence among flood-affected people that although living at home is logistically difficult at first, it is often the families who lived away during reinstatement who reported feeling less attached to their homes on their return. In addition, some respondents also reported that "the full impact of the flood did not become apparent until after reinstatement when they had time to reflect. Consequently keeping occupied seems to have delayed some health reactions" (Tapsell & Tunstall, 2008, p.144).

5.0 Does distress reflect PTSD?

In referring back to the wider literature, there is a consensus that the majority of longer-term problems directly relating to flooding are not physical but psychological in nature (Tapsell & Tunstall, 2008). Nevertheless, some of the literature is quick to clarify that natural disasters do not always lead to PTSD for those affected, although stress-related symptoms are commonly reported

(Stout & Knight, 1990). Studies suggest that PTSD is often but not always seen in victims of natural disaster (Adams & Adams, 1984; Brett & Ostroff, 1985; Malmquist, 1986) with more of those affected 'escaping long-term psychiatric illness' (Stout & Knight, 1990; p.132). Indeed the literature states that most disaster survivors will only experience mild stress reactions which are considered entirely normal in response to distressing events (NCPTSD, 2001). However Carlier & Gersons (1995) also suggest that there are larger numbers of people who don't meet full criteria for PTSD within flooded samples but who nevertheless require the same level of care as those who do. Additional studies also note an absence of PTSD symptoms within samples affected by flooding (Schucter & Zisnook, 1984; Ursano & Holloway, 1985) reinforcing that the profile of reactions to flooding is not easy to predict. Importantly, there is a wide range of reactions that are noted within flooded populations, and although these are often anxiety-related, many respondents refer to loss and anger as equally salient in the experience (Stout & Knight, 1990)

5.1 Understandings of criteria

Despite this re-evaluation of the normality of distress following traumatic life events, studies disappointingly tend towards focussing upon more pathological reactions to the exclusion of other responses. Carroll *et al.* (2009) suggests that it 'is clear that everyone doesn't respond in the same way to the same stressors and there are many manifestations of behavioural responses' (p.540), but they also state that individuals 'show acute anxiety over a short period and PTSD symptoms over a longer period' (p.540). Tapsell & Tunstall (2008) went further by documenting the proportion of clinical reactions following a 1998 flood (see Table 1):

Table 1: Proportions of clinical reactions cited by Tapsell & Tunstall (2008) following flooding

Psychological difficulty	Proportion of sample experiencing it
Anxiety at reminders of the event	59-87%
Increased stress	35-87%
Sleeping problems	18-87%
Moderate depression	16-33%
Flashbacks and nightmares	Up to 53%
Anger and severe depression	9-20%

Similar symptoms were noted within the BBC Radio Cumbria Survey (2005) and the Communities Reunited Health Survey (2006), and were reported to occur over a period of twelve months after the flood (Carroll *et al.*, 2009). In addition, Tunstall *et al.* (2006) reported that 15 per cent of their flooded sample experienced some degree of PTSD symptoms. They measured PTSD scores of individuals and reported the frequencies of the range of symptoms within the sample (shown in Table 2 below):

Table 2: Proportions and severities of PTSD reactions cited by Tapsell & Tunstall (2008)

PTSD symptoms	Proportion of flood sample reporting these symptoms	Non-flooded sample reporting these symptoms
No symptoms	21%	35%
Very low symptoms	49%	56%
Low symptoms	15%	8%
Mild symptoms	10%	2%
Moderate / high / extreme symptoms	5%	

The frequencies reported in Table 2 appears to provide compelling evidence for the presence of PTSD within flooded samples; however when considered against DSM IV criteria for PTSD it is not clear from their accounts which level of symptoms actually reach this classification. Indeed, it is possible

that PTSD might occur within only a proportion of the five per cent moderate/high/extreme group they describe and that symptoms below this point might not be eligible to be classified as PTSD at all.

Related to this Carroll *et al.* (2009) report that, the most common symptoms reported were: 'panic attacks, flashbacks, disturbed sleep, lack of motivation, unsettled and obsessive behaviour' (p.544) stating their conclusion that 'these are the symptoms associated with PTSD' (p.544) and that 'many people suffered from anxiety and stress in different forms for around a year after the floods, which could indicate the occurrence of PTSD or partial PTSD' (p.544). Unfortunately, seeming to classify PTSD without reference to diagnostic criteria opens studies up to criticism and suggests that they have not considered the potential normality of some of these responses following distressing events. Indeed, one individual is quoted as being 'particularly traumatised and fought to control her emotions while talking about' her experience (Tapsell & Tunstall, 2008; p.145). However, what she actually reported: '*I woke up at 1 o'clock and water was coming in downstairs... I'm sorry [tearful]... whole of the ground flood was gone, we hadn't long had the house, everything was new... everything was handmade.. [fighting to control emotions]'* (Tapsell & Tunstall, 2008; p.145); could be considered a normal response to recalling a recent disaster event. Concerningly, literature tends to deviate from normalising these reactions and presents such quotes as evidence of 'traumatisation'. Although the distress caused by flooding should not be minimised and it is possible for some individuals to develop a diagnosable PTSD reaction, it is unclear from these studies about the extent to which documented reactions could be normal responses to distressing life events, or indeed how studies define what they consider to be 'normal' under such circumstances.

In summary, although qualitative flood studies are valuable in documenting individual experiences and distress, by not considering the classification of PTSD, they are open to criticism, making it more likely that the valuable lessons from their findings are lost due to their difficulties in quantifying the

classifications they rely upon. Consequently, for the purpose of this study, it might be useful to clarify the classification of PTSD being referred to.

6.0 Clarifying Classifications

The concept of psychological distress following traumatic experiences has been discussed in the medical and psychological literature for over a century (Dalgleish, 2004) most notably in relation to war veterans (Rivers, 1920) and has developed exponentially (Brewin & Holmes, 2003) particularly since the recognition of posttraumatic stress disorder (PTSD) as a formal psychiatric disorder in the Diagnostic and Statistical Manual (DSM III) (American Psychiatric Association, 1980). Young (1995) highlights that the classification of PTSD has also changed over time, having developed into more general use and applied to everyday situations. Although this is valuable in recognising the wider occurrence of traumatic events, significant debates ensue within the literature around the classification of the disorder.

6.1 Classification of Posttraumatic Stress Disorder (PTSD)

The current edition of DSM IV (APA, 2000) outlines the diagnostic criteria of posttraumatic stress disorder with reference to individuals being exposed to a traumatic event in which (A1) "the person experienced, witnessed or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others" and (A2), in which the individuals' responses "involve intense fear, helplessness or horror". These two conditions constitute the first criteria (Criterion A) required for diagnosis of the disorder.

Following such an event, diagnosis of PTSD is then based upon presentation of symptoms from three distinct symptom categories:

Criterion B symptoms associated with **re-experiencing** the trauma.

Criterion C symptoms associated with **avoidance of reminders or numbing symptoms.**

Criterion D symptoms associated with **increased physiological arousal.**

Within each category, affected individuals must present with a specified number of distinct recognised symptoms in order to meet the diagnostic criteria. For example, individuals must present with one or more symptoms which indicate that the trauma is "persistently re-experienced" after the event (Criterion B). These include: recurrent and intrusive recollections of the event in the form of images and thoughts about the event, nightmares, flashbacks and episodes in which the individual believes the event is happening again, increased emotional and physiological distress on being reminded of the event.

Avoidance and numbing symptoms (Criterion C) require presence of three or more symptoms which indicate "persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness". Avoidance symptoms involve avoiding thoughts, feelings, conversations, situations or people that arouse recollections of the trauma and inability to recall aspects of the trauma. Numbing symptoms also include diminished interest or participation in significant activities, feeling detached from others, presenting a restricted range of emotions and having a sense of a foreshortened future.

Finally, symptoms of increased arousal (Criterion D) require two or more symptoms such as sleep and concentration difficulties, irritability or anger, hypervigilance to danger and an exaggerated startle response. Posttraumatic stress disorder is only diagnosed following presence of symptoms for

more than one month and when they cause clinically significant distress or impairment in social, occupational or other areas of everyday functioning.

Symptoms must also present for at least one month (Criterion E), and must cause 'clinically significant distress or impairment in social, occupational or other important area of functioning' (Criterion F). The literature also distinguishes between differences in the course of the disorder, classifying symptoms as acute when their duration is less than three months and chronic when difficulties last three months or more. Delayed-onset PTSD is classified in instances where onset of symptoms occurs at least six months following the traumatic stressor.

6.2 Differential diagnosis

An important distinction in DSM IV criteria is that the classification of acute stress disorder is virtually identical to that of PTSD, with the main exception of the time interval of the difficulties (i.e. the same symptoms experienced over less than a month would be diagnosed as an entirely different disorder) (APA, 2000). Although both disorders are mentioned in the literature as being observable in flooded samples (Waelde *et al.*, 1998), studies do not distinguish between classifications of these disorders when discussing them. In particular, the literature clearly documents that distressing events associated with flooding can last for between a few months to over a year in duration, therefore how does the literature identify the 'index' event within the disaster in order to establish the timescale for classifying PTSD rather than other stress reactions. Consequently the PTSD classifications presented in the literature as rendered as potentially questionable.

Furthermore, as noted in the criteria, PTSD is 'among the few psychiatric diagnoses with embedded assumptions regarding its aetiology' (Bodkin *et al.*, 2007; p.177) with Criterion A requiring not only a

certain type of event but also a specific response at the time as the primary determinant of whether PTSD can be diagnosed or not. If the type of event does not fulfil the definition, then diagnosis of PTSD is not possible, regardless of whether individuals meet every remaining criterion for the disorder.

Unfortunately, the literature does not agree on the criteria pertaining to the nature of the event itself. For example, PTSD literature describes that farmers affected by Foot and Mouth disease, presented with posttraumatic stress disorder symptoms (Paykel *et al.*, 2000; Peck, 2005; Olff *et al.*, 2005; Thomas *et al.*, 2003). In the face of farmer's experiences, such as the magnitude of loss experienced and exposure to burning pyres of cattle, often in close proximity to their homes, the presence of intrusive symptoms, numbing, hyperarousal and avoidance symptoms may be considered as hardly surprising. However, opposing literature has 'seriously questioned livestock loss as a traumatic event' (Elhai *et al.*, 2005; p.190), criticising any deviation from DSM IV criteria and suggesting that studies would soon be presented on 'children 'traumatised' by watching their pet hamster's death, or from watching Bambi die in the famous Disney movie' (Elhai *et al.*, 2005; p.190). Although such attempts to clarify diagnostic criteria are valid, and they raise concerns that making all negative experiences 'synonymous with traumatic events is trivialising the experiences of 'real victims'' (Elhai *et al.*, 2005; p.190) they subjectively minimise the distress experienced by some people in the face of disastrous events. In doing so, they suggest that depending upon the event, some people are more 'deserving' of being distressed than others. Not only is it concerning that professional perceptions might minimise the distress experienced in such events, but this perception is subsequently condemned by opposing arguments into the subjectivity of Criterion A as a diagnostic requirement (Van Hooff *et al.*, 2009).

6.3 Significance of events

Despite the importance of classifying the event in terms of Criterion A, the DSM IV guidebook itself debates whether or not to 'include reactions to numerous stressors that are upsetting but not life threatening' (Frances *et al.*, 1995; Olff & Gersons, 2005; p.190). Furthermore, the other criteria for PTSD are in fact particularly common in other populations; for example, 78.6 per cent of patients being treated for major depression show Criteria B (intrusions), C (avoidance and numbing) and D (hyperarousal) symptoms regardless of having a history of Criterion A trauma or not (Bodkin *et al.*, 2007). Furthermore the prevalence of these symptoms is virtually identical regardless of trauma history (Bodkin *et al.*, 2007; Gold *et al.*, 2005; Mol *et al.*, 2005). In addition, the literature contends that non-Criteria A events are in fact associated with greater symptom frequency of 'PTSD symptoms' (Long *et al.*, 2008), the most notable of which included relatively common life events such as divorce (Creamer *et al.*, 2005) which are not life-threatening.

Consequently the literature questions whether these characteristic symptoms of PTSD are necessarily caused by trauma (Bodkin *et al.*, 2007) and highlights that many of the other symptoms required for diagnosis of PTSD (intrusions, avoidance, emotional numbing and hyperarousal symptoms) are classified by DSM IV within diagnostic criteria for other disorders such as major depression, dysthymic disorder, generalised anxiety disorder and acute stress disorder (APA, 2000; Bodkin *et al.*, 2007).

6.4 What does all this mean clinically?

The literature on disasters and PTSD are of considerable clinical interest. However their weaknesses generate more questions for clinical practice than they answer. In a clinical setting, faced with an individual who is affected by flooding, does the presence of 'characteristic' symptoms of PTSD mean

they actually have it? Does the event fit the criteria which currently makes PTSD a valid diagnosis for them, or is it 'not traumatic enough'? How can we objectively judge what fits Criterion A or not when we are looking at an event with the benefit of hindsight, with less awareness of how frightening or life-threatening the event might have appeared at the time? Even if it objectively does fit this definition, is it actually PTSD or are the symptoms instead explained by other DSM IV classifications which share some of the same criteria but for different disorders? And does the apparent severity of the distress mean it is 'disordered', or might it be a 'normal' response to difficult situations?

In the face of all these questions it is difficult to see how a clinician might draw upon the literature for an answer without ending up relying upon their subjective conclusions about the event. However at such times, a return to focussing upon formulation rather than getting caught up in diagnostic classifications might provide a clearer direction. Unfortunately, in selecting models to guide formulations, we also run the risk of attaching labels to post-disaster difficulties, for example basing our formulative assumptions on perceiving a depressive reaction, or an obsessive-compulsive reaction which might be subjectively based upon clinician perceptions to the exclusion of considering the importance of flood experience and meanings in the development of such difficulties.

As a clinician with personal experience of flooding, it is difficult to navigate a path through the literature which is clinical enough in its formulation as to generate valuable intervention strategies, but which is flexible enough to account for the complex interplay of factors pertaining to such an experience. As a result, if this is difficult for someone with experience of it, how might clinicians navigate this issue without such experience for guidance?

Reassuringly, suggestions within the current literature may provide valuable insight into this issue as Olff & Gersons (2005) highlight significant points that are relevant to the understanding and formulation of a variety of post-disaster reactions. Firstly, situations are often as much associated

with sadness as with fear (suggesting the possibility of other emotions involved in traumatic reactions). Secondly, degree of distress is dependent on subjective appraisal by the individual and not objective consideration of stressor severity (or predictors of this within the event, such as water depth). Thirdly, any event considered sufficiently outwith someone's control or "range of experience", could potentially lead to symptoms of PTSD. Furthermore, Bodkin *et al.* (2007) questioned whether the characteristic symptoms of PTSD (intrusions, avoidance, hyperarousal and numbing) are caused by the trauma per se or by another mechanism, which is corroborated by the literature showing that characteristic symptoms of PTSD are prevalent following non-traumatic events (Gold *et al.*, 2005; Mol *et al.*, 2005).

With regard to these particular points is that recent literature has presented a specific model of emotion generation (Dalgleish & Power, 2004) which has received interest not only in describing normal emotion but also PTSD (Power & Dalgleish, 2008), bipolar depression (Jones *et al.*, 2005; Power & Schmidt, 2004) and eating disorders (Fox & Power, 2009). Of relevance to flooding, the model has the potential to explain a variety of normal and disordered traumatic reactions, as well as providing explanations for the occurrence of a wide variety of trauma-related symptomatology. Despite its discussion within the literature, the model receives less attention in terms of direct clinical utility in practice. However, could this model be of benefit in helping clinicians to understand and formulate experiences of disaster events?

7.0 Schematic Propositional Analogue and Associative Representational Systems – SPAARS model

The SPAARS model (Dalgleish, 1999; 2004; Dalgleish & Power, 2004) is a multi-level theory of emotion, which encompasses many elements of other cognitive appraisal models of emotion (Oatley

& Johnson-Laird, 1987) but adds an additional focus to the emotional content of experiences. Although presented as a model for understanding reactions to traumatic experiences, and PTSD in particular, it is essentially a model of the development of 'normal' emotion, but which it offers a mechanism for explaining when emotion becomes 'disordered'. The model is therefore equally applicable to understanding populations who experience subclinical distress.

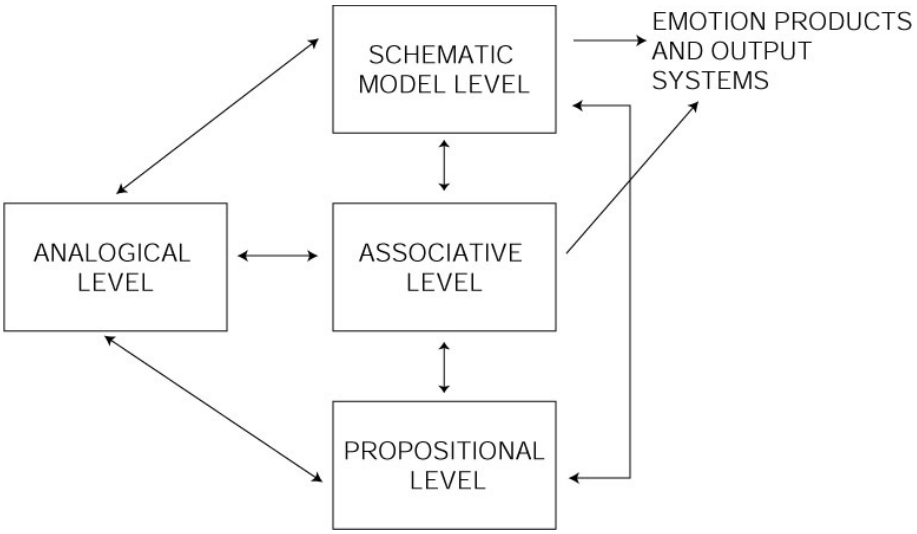

Figure 1: Schematic Propositional Analogue and Associative Representational Systems: SPAARS model (Dalgleish & Power, 2004)

7.1 Multi-level theory of emotion: what are the levels?

At a fundamental level, SPAARS proposes different levels at which information is processed and represented psychologically. Firstly, the Analogical level stores information in visual, olfactory, auditory and other sensory forms. The Propositional level retains representations of verbal information, including beliefs and ideas that can be expressed verbally.

The Schematic level represents higher-level concepts which we would understand to be associated with existing schemas relating to models of the self, the world and others. It is believed that these

cannot readily be described consciously by an individual but that they are significant in understanding emotional difficulties. For example, 'a schematic model of the world as a safe place is likely to contain more complexity than is captured by a simple propositional level statement such as "the world is safe"; rather, a model of the world as safe incorporates all aspects of what the concept of safety means to the individual and is a guiding construct for the way information is processed and organised within the system' (Dalgleish, 2004; p.238).

The Associative Level represents any automatic emotional reaction which occurs during the event but does not involve any appraisal at that time. Instead, responses by this level are considered to be either a learnt function based on past experiences (Logan, 1988) or a biological preparedness to react in a certain way such as is found in animal phobias (Seligman, 1971). Consequently, this level of processing is considered to be relatively inflexible to change or modification.

7.2 Appraisals and Emotion Generation

In contrast to other cognitive appraisal models of emotion, SPAARS proposes that there are in fact two routes through which emotions are generated. Firstly, it is generated by the Associate Level of processing, in which emotion is generated spontaneously during an event or in response to experiences without any 'online' processing of the occurrences, but merely based on psychobiological arousal or conditioned responses. This would explain, for example, why when people successfully overcome phobias and are able to expose themselves to feared stimuli; they will often continue to experience heightened arousal to the stimuli. SPAARS suggests this is because the Associate Level still responds to stimuli automatically, and is not readily altered.

Secondly, SPAARS proposes that events are appraised at the Schematic level with regard to the individual's active life goals. Consequently, depending upon how the event is interpreted in relation

to these goals, emotions can be generated. In this level, Dalgleish & Power (2004) draw upon categorical theories of emotion in that they suggest the generation of basic emotions – notably happiness, sadness, fear, anger and disgust (Dalgleish & Power, 2004; Power & Dalgleish, 2008). The proposition is that the five basic emotions are associated with distinct categories of cognitive appraisal and their relation to life goals (Table 3):

Table 3: Appraisal dimensions associated with basic emotions (Power & Dalgleish, 2008)

Basic Emotion	Associated Appraisal
Fear	Physical or social threat to self or valued role or goal
Anger	Blocking or frustration of goal through perceived other agent
Sadness	Loss or failure (actual or possible) of valued role or goal
Disgust	Unwanted association of person, object or idea that is repulsive to the self, and/or to valued roles, goals or ideals
Happiness	Successful move towards or completion of a valued role or goal

Appraisals about the meaning of events in relation to life goals therefore lead to 'existential' emotions based upon the appraisal outcome. Consequently, different emotions should be generated depending upon different appraisals made about obstacles which impede achievement of life goals (Oatley & Johnson-Laird, 1987). Importantly, once generated, emotions are considered to be functional mechanisms which provide an attempt to reconfigure the system in order to deal with the appraised obstacle.

Appraisals of events within this level can also increase in their complexity with further impact upon the emotions experienced; for example, an event which is appraised as creating an obstacle to a life goal would potentially generate anger in an individual; further appraisals may then become more sophisticated, such as attributing blame or intent for this obstacle on the part of an identifiable agent, which leads to increased anger. Increasing sophistication of appraisals places more demands on the resources within SPAARS, potentially leading to preoccupation with the event and its related difficulties.

7.3 SPAARS and Trauma Sequelae

In addition to explaining a mechanism by which emotion is generated, SPAARS seeks to explain characteristic posttraumatic stress sequelae using a number of novel concepts and considerations:

Firstly, much like DSM IV Criterion A, SPAARS proposes that there are two significant properties of events which can lead to posttraumatic stress reactions:

i) that the event is appraised as significantly discrepant from pre-existing schemas of the self and the world; and

ii) that it is 'highly emotive', leading to intense emotional distress via either the automatic or appraisal-driven route, or both (Power & Dalgliesh, 2008).

Consequently, rather than referring to objective properties of the event; SPAARS proposes the significance of the event's impact upon an individual, in line with appraisal theory.

SPAARS explains that when the appraisal-driven emotion is repeatedly paired with activation of trauma-related information, the emotion becomes further 'automatized' (Dalgleish & Power, 2004). Consequently, future encounters with information that is similar to the initial trauma (reminders of the event) will lead to the activation of the emotion with no further appraisal involved.

The model then proposes that this mechanism leads to the 'characteristic' symptoms of PTSD in three ways:

i) At the time of the trauma, information about the event is appraised as highly incompatible with individual's schematic models of themselves, the world and others and is therefore poorly integrated into existing representational models at the time of encoding.

As the unintegrated information continues to be processed, it is continually appraised as incompatible and threatening to existing schemas.

The SPAARS system then attempts to resolve the schematic discrepancy by trying to accommodate the information within existing schemas. This mechanism keeps representations of the traumatic event active within the cognitive system (Horowitz, 1986) thereby leading to **intrusive re-experiencing (Criterion B) symptoms**.

ii) These active trauma memories in the cognitive system cause repeated activation of the fear network, causing trauma-related information to continually intrude into consciousness. In addition, environmental cues related to the trauma memory also activate the fear network, further increasing the occurrence of intrusions.

The severity of the distress caused by this intrusive phenomena leads individuals to engage in a number of protective mechanisms in order to avoid reminders of the trauma, reduce activation of the fear network and mitigate the distress they are experiencing, which constitute **avoidance and numbing (Criterion C) symptoms**.

iii) As the fear network is continually being activated and reactivated (via appraisals of unintegrated trauma information and by multiple cueing from the environment), individuals remain in an almost continuous existential state of 'being in danger' (Dalgleish & Power, 2004). This state of persistent perceived threat leads to the **hyperarousal (Criterion D) symptoms**.

The particular relevance of the model relates to the fact that events which might not be considered objectively 'traumatic enough' to cause PTSD (for example, Foot and Mouth disease) are explained as having the potential to generate intense characteristic PTSD symptoms. SPAARS' definition of whether an event is 'traumatic enough' is different from other models of trauma experiences: it distinguishes events based upon the degree of discrepancy and emotion the event generates rather than objective traumatic elements. This concept supports Olff & Gersons (2005) in that events sufficiently outwith someone's 'normal experience' can be enough to generate PTSD symptoms. SPAARS therefore presents a model by which to explain some of the findings within the literature of PTSD-type reactions following distressing life events; explaining both the occurrence of symptoms in the face of objective traumas, and from other less traumatic events.

It would appear then that SPAARS adopts a model which seeks to 'dilute' the diagnosis of PTSD to encompass a myriad of life events; however, this is not in fact the case. SPAARS proposes that the 'characteristic' symptoms of PTSD (intrusions, avoidance, numbing and hyperarousal) are merely the manifestations of the cognitive system attempting to reconfigure distressing experiences to fit with existing schemas, and as such, the occurrence of these symptoms is not considered disordered or pathological. This concept is also supported by information-processing models within PTSD literature (Ehlers & Clark, 2000) which suggest that these symptoms occur in the majority of individuals to some degree following traumatic experiences. However, the majority of people are able to integrate trauma-related information into their pre-existing schematic models of the world, themselves and others (Rachman, 1980; 2001), generally through exposure to the information within a supportive social network or within a therapeutic context and therefore symptoms remit. Successful integration therefore involves being able to re-experience information which is incompatible to existing schemas in a way which allows them to 'perceive the event as something anomalous in a world where their schematic models still hold a significant place' (Dalgleish & Power, 2004; p.1083). This exposure weakens the link between the information held within memory and the fear network

(the associative level within SPAARS) by enabling the individual to experience a continual reduction in fear during repeated exposures.

SPAARS would therefore not consider intrusive experiences, avoidance, numbing and hyperarousal as being evidence of PTSD, rather as evidence of schematic processes at work; which is a valuable consideration in the face of literature showing a significant degree of these symptoms in populations where trauma experience is absent, but where difficult life events have been encountered. Consequently, SPAARS appears to have the potential to explain both the occurrence of normal and disordered reactions to difficult events within the same model; that regardless of degree of trauma experience, distress is resolved if the cognitive system fulfils its attempt to overcome the schematic discrepancy. If integration of new information is not fulfilled, the difficulties become disordered within the classification we currently recognise as PTSD.

7.4 SPAARS and emotional content

Within the literature, understandings of PTSD rely upon the assumption that fear is the primary emotion underlying an individual's PTSD reaction. Although this seems like a sensible contention, the literature notes that other emotions such as sadness (Olff & Gersons, 2005) might be as significant within trauma experiences as fear. Unfortunately, this is not clearly accounted for within other trauma models, and the difficulties relating to the profile of symptoms (i.e. sharing similarities with other disorders) are also not adequately explained elsewhere. However, SPAARS also provides a mechanism which might accommodate these issues.

In attempting to understand trauma sequelae, the SPAARS model adopts two important emotional constructs:

1. The **Emotion-non-specific component** of trauma - refers to sequelae which arise as 'a function of the cognitive system's attempts to resolve the discrepancy between the trauma event and pre-existing schemas but which are independent of the emotional response that is elicited by the traumatic event' (Dalgleish & Power, 2004; p.1072).

   This component therefore includes **Criterion B re-experiencing symptoms** (which occur as the cognitive system attempts to resolve the discrepancy) and **Criterion C avoidance symptoms** (which result as a defence against the distress caused while trauma information remains active).

2. In current cognitive theories of trauma, events lead to the emotional response of fear (Criterion A), which is experienced both at the time of the event and is elicited in response to the re-experiencing symptoms (Criterion B). Dalgleish & Power (2004) refer to this as the **Emotion-specific component** of trauma as it is 'intrinsically related to the type of emotion elicited by the original trauma' (p.1073).

SPAARS proposes that any event which is discrepant from pre-existing schemas will result in the emotion-non-specific symptoms (re-experiencing, avoidance and existential affect from appraisals). It also proposes that the nature of the emotion-specific symptoms is dependent on the emotions elicited by the event – but that these emotions are not solely predicted by the event (associative level) but also to the nature of the appraisal made by the individual (schematic level). Significantly, the same event appraised differently by different individuals will generate different emotions. Therefore, the model suggests that trauma sequelae (Criteria B, C and D symptoms) can therefore occur due to elicitation of other emotions than fear.

This concept is novel within the literature, and in relation to these four basic emotions, Dalgleish & Power (2004) propose the potential for 'a family of PTSD-like psychological reactions which resemble

PTSD in terms of emotion-non-specific component but which will differ in their emotion-specific component in ways that are dependent on the specific emotional nature of the event' (Dalgleish & Power, 2004; p.1073). Consequently, SPAARS appears to have the potential to explain the wide variety of reactions noted within individuals affected by traumatic experiences, particularly when they appear to deviate from 'classic' trauma reactions.

7.5 Sadness and Traumatic Loss

SPAARS considers that grief reactions following distressing experiences result from the cognitive system being unable to integrate information about loss into pre-existing schemas. As described, attempts to resolve this discrepancy lead to re-experiencing, avoidance and existential emotions in common with PTSD reactions. As a result, we would expect to see the similarities between PTSD and traumatic grief that are presented in the literature (Shuchter, 1986; Shuchter & Zisook, 1993). However, with grief, the dominant emotion is one of sadness in response to an appraisal of loss, which is experienced both at the time of the event, but also as a consequence of the re-experiencing symptoms. SPAARS suggests that this constitutes the emotion-specific component of the event, which is independent of the emotion-non-specific component and explains why PTSD and grief diverge on some features, (for example that there is little evidence of exaggerated startle responses and hypervigilance following loss) (Jacobs, 1999; Raphael & Martinek, 1997; Schut *et al.*, 1991). However, the model therefore demonstrates that two distinct disorders can be conceptualised as similar in their emotion-non-specific component but 'predictably diverge from one another based on emotion-specific aspects as we would expect for a pathology based on sadness rather than fear' (Dalgleish & Power, 2004; p.1077).

7.6 Anger

Whereas sadness is considered within the literature to be associated with loss (Power & Dalgleish, 2008; Oatley & Johnson-Laird, 1987) there is a general consensus that anger-related appraisals are associated with 'blocked goals' (Averill, 1982; Lazarus, 1991; Scherer, 1999) as a result of 'an identifiable agent preventing or causing the goal to be unobtainable through deliberation or negligence' (Power & Dalgleish, 2008; p.318). Within SPAARS, Dalgleish & Power (2004) propose that anger experienced within traumatic circumstances might share the emotion-non-specific component in common with PTSD and grief, involving patterns of re-experiencing, avoidance and existential emotions, but that the emotion-specific component would diverge where anger is felt at the time of the event and in response to the emotion-non-specific components. Although these concepts are in their infancy, there is some support for these findings within clinical settings (Eckhardt & Deffenbacher, 1995).

7.7 Disgust

Disgust has received little clinical discussion within the literature compared to other emotions (Phillips *et al.*, 1998) although has become more widely considered, particularly in how it relates to specific phobias (McNally, 2002).

The SPAARS framework proposes the possibility of a discrepancy-based trauma related to disgust experienced in response to extremely disgusting events. In this regard, emotion-non-specific components would again share the same features as those of anger, sadness and fear; yet emotion-specific aspects would predictably relate to intense feelings of disgust at the time of event, and in response to reminders, with physiological responses related to disgust, such as feelings of nausea and vomiting or scanning the environment for contamination.

7.8 Emotion Regulation

As a model of emotion, it is also the important to consider emotion regulation strategies in determining outcomes of distressing events. Although a variety of alternative literature considers strategies such as problem-focussed and emotion-focussed coping (Carver *et al.*, 1989) and the concept of emotion regulation, the SPAARS model relies on a different understanding of this.

As the model fundamentally considers that emotion is a functional mechanism, with the aim of providing information with which to overcome obstacles (Power & Dalgleish, 2008) it relies upon the concept that 'functional' emotion regulation strategies are those which make use of the information provided by the emotion and 'dysfunctional' strategies are those which do not, or which actively block the emotional information (Phillips & Power, 2007). Consequently, in common with other PTSD models, SPAARS considers that use of blocking strategies would result in failure to consider emotional information, leading to failure in overcoming the obstacle or accommodating schematic discrepancies, therefore further maintaining an individual's distress (Ehlers & Clark, 2000).

8.0 SPAARS, traumatic experiences, emotions and flooding

It is of particular value to the disaster literature that a single model may comprise mechanisms by which to understand both normal and clinically significant distress, as well as providing a means of understanding the variety of possible reactions that might occur. Anecdotally, and within the flood literature, there are glimpses of evidence which support SPAARS concepts. For example, flood-affected populations report experiencing elements of the four emotions (fear, anger, sadness and disgust) which Dalgleish & Power (2004) propose as being most relevant within traumatic reactions and SPAARS appears capable of explaining complex combinations of these emotions in relation to comorbid appraisals.

Flooded samples also clearly report the appraisals presented as being related to these emotions in the literature (Carroll *et al.*, 2009; Tapsell & Tunstall, 2008), for example, fear is described at the time when water enters people's houses and at times following reinstatement especially when rainfall is greater than usual (Carroll *et al.*, 2009). In addition, anger is reported towards agencies involved in the floods, sadness is described due to the loss of possessions and disgust is frequently a salient emotion for those whose homes were contaminated by sewage. Furthermore, flooding appears to be a homogenous experience, yet populations resemble a group of vastly heterogeneous reactions due to individuals focussing on particular aspects of the event which were individually salient to them. Importantly, SPAARS also potentially provides a format for considering these appraisals as well as being able to accommodate for the absence or presence of distress at any severity.

Despite being presented in the PTSD literature, SPAARS is firstly a model of emotion generation and schematic discrepancy, making it uniquely applicable to 'traumatic experiences' in which criteria for PTSD (or other disorders) would not be met. Indeed the disorder in question is not even relevant. It is a model whose fundamental principle is the subjective appraisal made by the individual and that distress in terms of some symptoms (intrusions, avoidance, numbing and hyperarousal) should not be considered pathological per se. In selecting a model which has the potential to compensate for the vast disagreements in the literature pertaining to distressing experiences and which has clinical utility with regard to formulating difficulties psychologically, it therefore appears that SPAARS may be a valuable model to consider. However, despite being discussed more widely within the literature in recent years, it is not a model that is familiar to nor seen as relevant by the majority of clinicians when trying to understand these experiences, potentially because of its theoretical complexity when first encountering the model as well as the current lack of quantitative evidence demonstrating its usefulness.

8.1 Aim of current study

There is a great deal of anecdotal evidence within flooded populations suggesting the validity of SPAARS concepts; in fact a brief conversation with flood-affected people about their experience would afford most investigators with this information. Unfortunately, there is less quantitative data supporting this. The primary aim of this study is therefore to quantitatively investigate the emotional and psychological impact of an event such as flooding as previous studies have done qualitatively. In doing so, it is intended to investigate the possible presence of quantifiable evidence of SPAARS concepts within flooded samples in order to ascertain whether this model might be of clinical utility in understanding populations who have experienced disasters.

More specifically:

Question 1 Although distress is widely documented in the literature, to what extent do flooded individuals experience clinically significant symptoms or distress?

Question 2 If different appraisals of an event can lead to emotions other than fear, to what extent do flooded samples report emotions other than fear (e.g. anger, sadness, disgust)?

Question 3 If individual appraisals are more important in reflecting distress, what (if any) relevance do objective predictors (e.g. height of water, etc) have in flood experience? (i.e. are there differences in distress of flooded people related to the predictors investigated in previous literature?)

Question 4 What evidence is there of different appraisals related to different emotions as outlined by the model; and if there is an emotion-specific component to people's

experiences, does the presence of certain emotions generate different symptomatology?

8.2 Hypotheses:

In terms of each question, and based specifically on the SPAARS model:

Question 1.

Hypotheses:

a. As 'distress' would be normal to a degree in flooded samples, it is hypothesised that a smaller proportion of individuals might experience symptoms of distress (on the TSI) when compared to the levels of distress reported in previous flooding studies.
b. As SPAARS considers Criteria B, C and D symptoms as being 'normal' in resolving schematic discrepancies, it is hypothesised that a greater proportion of individuals will report higher levels of these symptoms (emotion-non-specific) compared to other symptoms of distress (emotion-specific).

Question 2.

Hypotheses:

a. Other emotions will be experienced during the flood in addition to fear (and possibly to the same degree)
b. Other emotions will be experienced after the flood in addition to fear (and that other emotions may occur to a greater degree in the aftermath than during the event).

Question 3.

Hypotheses:

a. According to SPAARS, the meaning of the event is greater than objective predictors, and therefore previous predictors, including height of water, location at the time of flooding, insurance difficulties, should not in themselves have a significant effect on the impact of the event or distress measures.
b. Based on understandings of distress within this model, those scoring highly for dysfunctional emotion-regulation strategies should show greater distress or impact of the event.
c. Degrees of distress will be reduced over time (i.e. be higher in a sample flooded more recently than one flooded a longer time ago).

Question 4.

Qualitative hypotheses:

a. In semi-structured interview, there should be evidence of a) the four basic emotions outlined (fear, sadness, anger and disgust), and b) the associated appraisals as outlined in the literature (threat, loss, blocked goals/negligence, repulsion).
b. That experience of such emotions (e.g. disgust), linked to appraisals (e.g. contamination) will be directly associated with emotion-linked behaviours (e.g. obsessive washing).

Methodology

9.0 Populations

Two previously flooded sites, Carlisle in Cumbria and Morpeth in Northumberland, provided populations for sample recruitment. Within Carlisle, severe storms and unprecedented rainfall fell across Cumbria causing flooding of the River Eden and leading to extensive flooding in the City of Carlisle and its surrounding area in January 2005. The flood caused damage to 1925 homes and businesses which endured up to two metres of contaminated water and resulted in over 3000 people being homeless for at least twelve months. In addition, damage to the city's utilities left the entire city and its agencies, and a total of 40,000 properties without power for more than 48 hours. In Carlisle, the flood also claimed the lives of three people (Cabinet Office, 2009). Within Morpeth, unprecedented rainfall exacerbated already high river levels in Northumberland and the equivalent of three times the monthly average rainfall fell within a 48-hour-period causing the River Wansbeck to flood into the town in September 2008. The water enveloped over 950 homes and businesses within the town though fortunately no lives were lost (Morpeth Flood Action Group, 2009). Two populations, both within the north of England and flooded three years apart therefore provided a unique opportunity for recruitment.

10.0 Ethics

Although expecting to gather a sample of distressed individuals, participants were not recruited as a clinical sample or identified through healthcare services; therefore only University of Edinburgh ethics was required and was subsequently granted (see Appendix 1). Although NHS ethical approval

was not necessary, local NHS Research & Development Departments in Morpeth and Carlisle were contacted as a matter of courtesy (see Appendix 2). Both departments clarified that their approval was not required for community sampling but reiterated the importance of informed consent and for participants to be able to withdraw from involvement at any time.

11.0 Design

Selecting from two flooded populations offered an opportunity to investigate individual emotional reactions following a specific traumatic event which was experienced by a number of people at a single interval in time. When looking at differences in individual experience, the nature of the trauma is controlled for in flooded populations. Two flooded samples also provided an opportunity to compare differences or similarities between two events which occurred at different times.

The study comprised two design phases: firstly, an independent samples design selected samples from two independent flooded populations which were intended to provide a quasi-longitudinal design in which quantitative cohort data were available to compare traumatic and emotional reactions at two different stages in flood recovery. Following this, within the second phase, a number of individuals were identified from their quantitative data on distress and emotional reactions to the event. Semi-structured interviews were designed to gather more detailed data on flood experiences in order to gain a better understanding of the contribution of cognitive appraisal involved in such an experience.

12.0 Participants

12.1 Design Phase One: Quantitative

Within the study, three specific participant samples were sought:

i. A sample from Carlisle which was four years post-flood – to reflect the longer term impact of residential flooding.

ii. A sample from Carlisle of individuals now living within the flooded area but who did not live there at the time of the flood. This sample was intended to act as a pseudo-control group for comparison with those flooded in Carlisle in 2005. This group was also subject to perceived future threat by living within the area affected by flooding but could control for the effects of previous flood trauma having not been subjected to it themselves.

iii. A sample from Morpeth which was six months post-flood – to establish the current short-term impact of flooding, at a time when people were beginning to return to their homes and were within the timescale for more chronic posttraumatic difficulties.

Power analyses were used prospectively to ascertain the necessary sample sizes for statistical analysis using a between samples t-test. According to Clark-Carter (1997), the sample size required was n = 52 for each of the participant groups above in order to achieve a moderate effect size (0.4) giving a statistical power of 0.8.

In recruiting, participants were required to be over the age of 18 and be without a learning disability which might affect their ability to consent or understand the study information or questionnaires but no other exclusion criteria were applied during recruitment. Within Carlisle, 32 flood-affected respondents completed the questionnaires and two control participants completed the study in total. In Morpeth, 29 respondents completed the questionnaires.

12.2 Design Phase Two: Qualitative

At the time of consenting to the study, individuals were asked to give consent to be contacted at a later date in order to possibly participate in a more detailed interview about their experiences of the flooding.

These individuals were selected based upon their scores on quantitative measures, i.e. individuals with the highest scores for both symptomatology and for experience of emotions either at the time of the flood or in the aftermath. Depending upon the number of volunteers recruited, it was hoped to select at least two interview participants corresponding to each of the four basic emotions central to the study (i.e. two participants reporting higher anger and trauma symptoms, two reporting higher sadness and trauma symptoms, two reporting higher fear and trauma symptoms, and two reporting higher disgust and trauma symptoms).

13.0 Measures

The following quantitative measures were presented to participants to establish their experience within a number of domains. Although not intending to document PTSD symptomatology to the exclusion of others, some PTSD-based measures were used as they best captured the symptoms outlined by the SPAARS model.

13.1 Underlying emotions

As a measure of the underlying appraisal-driven emotions proposed by the SPAARS model (Dalgleish & Power, 2004), the **Basic Emotions Scale (BES)**, (Power, 2006) was used to retrospectively measure basic emotions (outlined by SPAARS) experienced at the time of trauma.

The BES provides a list of 21 'emotions', identified through factor analysis as being related to aspects of the five primary emotions considered in the SPAARS literature: happiness, sadness, anger, fear and disgust, and which combine to produce a subscale score for each of the five emotions. Each item requires participants to indicate the frequency with which they have experienced the emotion on a seven-point scale (scoring 1 indicates never having experienced the emotion, up to a score of 7 indicating having experienced the emotion 'very often'). The scale demonstrates high internal consistency across subscales (with Cronbach's alpha ranging from 0.848 to 0.942) (Power & Tarsia, 2007); and has been validated by factor analysis (Power, 2006) as well as within a number of clinical samples (Fox & Froom, 2009; Power, 2006).

For the purpose of this study, two versions of the scale were adapted to account for differences in emotional experiences at different time points within the flood events studied:

i. The first specifically measured emotions experienced **during the flood** while water was still within participants' properties (BES1, see Appendix 6).

ii. The second specifically measured emotions experienced **after the flood**, once water had subsided from their homes and insurance companies were becoming involved (see BES2, see Appendix 7).

Each participant generated ten emotion subscale scores; scoring for each of the five primary emotions during the flood event and the primary emotions in the aftermath.

13.2 Impact of the event – Emotion-non-specific component

As a measure of the emotion-non-specific component of the SPAARS model (Dalgleish & Power, 2004), the **Impact of Events Scale - Revised (IES-R)** (Weiss & Marmar, 1996) was adopted to establish symptoms characteristic of DSM IV criteria but which SPAARS suggests is related to discrepancy resolution.

The IES-R (see Appendix 8) is a 22-item self-report scale assessing subjective distress after a stressful life event. The IES-R is a modified version of the Impact of Events scale (Horowitz, Wilner & Alvarez, 1979) which did not originally measure symptoms of hyperarousal. Both versions have been widely validated as measures of PTSD, however the IES-R specifically is considered a reliable tool, with high internal consistency (reflected in Cronbach's alpha ranging from 0.87 to 0.91 for intrusions, 0.84 to 0.85 for avoidance and 0.79 to 0.9 for hyperarousal) (Sundin & Horowitz, 2002) and test-retest reliability ranging from 0.89 to 0.94 (Weiss & Marmar, 1996). Furthermore, the measure has demonstrated reliability within a variety of trauma-exposed populations (Coffey & Berglind, 2006; Neal *et al.*, 1994; Sundin & Horowitz, 2003), have high correlation with other measures of posttraumatic stress symptoms (Weiss & Marmar, 1996) and have demonstrated clinically reliable cut-off scores for posttraumatic stress disorder (Beck *et al.*, 2008; Sundin & Horowitz, 2003).

The IES-R outlines eight items relating to experience of **traumatic intrusions** (such as unbidden thoughts, feelings or images of the event), eight items pertaining to experiencing **avoidance** (such as trying to avoid reminders of the trauma or dulling their emotional reactions to it) and six items related to **hyperarousal symptoms** (such as feeling irritable or being easily startled). Participants are asked to rate the degree of distress caused by each item within the past seven days on a four-point scale (scoring 0 if an item is not distressing at all, to scoring 4 if the item has been extremely distressing). Participants' ratings generate a score for each subscale (taken as the mean score for subscale ratings) and a total IES-R score (the sum of the subscale scores).

13.3 Trauma Symptoms – indicative of distress and emotion-specific component

As a measure of distress and the emotion-specific component of the SPAARS model (Dalgleish & Power, 2004), the **Trauma Symptoms Inventory (TSI)** (Briere, 1996) was adopted to establish other symptoms associated with traumatic or distressing experiences.

The TSI (see Appendix 9) is a 100-item global measure of posttraumatic and psychological sequelae of traumatic events. It is intended for evaluating acute and chronic symptomatology in events including natural disasters, and exhibits reasonable validity and reliability (Briere, 1996) as well as being a standardised measure with extensive population norms. It is considered a reliable and valid measure with Cronbach's alpha ranging from 0.84 to 0.87 within the subscales for both clinical and non-clinical samples (Briere *et al.*, 1995; Stander *et al.*, 2007).

The TSI contains three validity subscales:

1. **Atypical Response (ATR)** – assesses the extent to which participants are considered to over-endorse symptoms which normative data suggested should rarely be reported regardless of traumatic experience. For example, feeling one side of body going numb, losing your sense of taste, or seeing people from the spirit world. Based on normative data, higher scores on this scale suggest individuals presenting themselves as either unusually symptomatic, or with psychotic symptoms, either of which are reported to invalidate the clinical data for an individual derived from the TSI according to the authors of the measure.

2. **Response Level (RL)** – assesses the extent to which participants are considered to deny experiencing symptoms which others commonly endorse in normative data, even in the absence of traumatic experiences. For example, lower back pain, aches and pains, wishing you had more money, and feeling tired. Normative data suggest that higher scores on this scale suggest individuals presenting themselves as not experiencing typical symptoms found within non-clinical and general population samples. Consequently the authors state that those scoring more highly on this scale are thought to be more defensive or avoidant, making data for an individual clinically invalid.

3. **Inconsistent Response (INC)** – assesses the extent to which individuals respond to similar TSI items (e.g. Item 5: getting angry about something that wasn't important and Item 15: getting angry for little or no reason) in a manner that is inconsistent compared to the general population. Higher scores on this scale are suggestive of random responding, poor attention or reading difficulties, which authors suggest will invalidate the clinical data on the TSI for an individual.

Each validity subscale of the TSI has a cut-off above which the responses are considered to be clinically invalid (Briere, 1996): T-scores above 90 are the cut-off for Atypical Responses (ATR), above 73 are the cut-off for Response Level items (RL), and above 75 are the cut-off for Inconsistent Responses.

In addition, the TSI contains ten clinical subscales, measuring the extent to which participants report experiencing different types of trauma-related symptoms:

a. **Anxious Arousal (AA)** – measures symptoms of anxiety and arousal such as trembling, nervousness and excessive worrying.

b. **Depression (D)** – measures experiences of depressed mood and depressive thoughts, such as feelings of sadness and viewing the future as hopeless.

c. **Anger / Irritability (AI)** – measures symptoms of angry and irritable mood as well as angry thoughts and behaviour, such as wanting to hurt someone and being argumentative.

d. **Intrusive Experiences (IE)** – consists of items reflecting intrusive posttraumatic reactions including nightmares, flashbacks and unwanted memories.

e. **Defensive Avoidance (DA)** – reflects avoidant responses which are associated with the Criteria C symptoms of PTSD, such as attempts to avoid or eliminate distressing thoughts or memories from conscious awareness and neutralised negative emotions.

f. **Dissociation (DIS)** – measures the extent that participants experience dissociative symptoms such as emotional numbing, cognitive disengagement and feeling out of touch with reality.

g. **Sexual Concerns (SC)** – measures symptoms of sexual distress and dysfunction such as negative thoughts or feelings towards sex.

h. **Dysfunctional Sexual Behaviour (DSB)** – measures experiences of sexual behaviour that might be considered problematic such as casual sexual contacts or with people who might be dangerous.

i. **Impaired Self-Reference (ISR)** – measures a variety of difficulties associated with an inadequate sense of self and personal identity, such as difficulties understanding their own behaviour or inability to resist the demands of others.

j. **Tension Reduction Behaviour (TRB)** – measures behaviours that an individual engages in to mediate negative internal states, such as externalising distress into suicidal behaviours, self harm or behaviours which might be considered as "acting out", such as aggression.

Participants are asked to rate the frequency of each symptom experienced in the past six months on a four-point scale (scoring 0 if an item is never experienced, to scoring 3 if the item is experienced 'often'). Scores are generated on each subscale and standardised scores are presented so that outcomes can be profiled against general population norms. A standardised score of 65 or above is considered clinically significant for each subscale.

13.4 Emotional Regulation

In terms of the SPAARS model, the **Regulation of Emotion Questionnaire (REQ)** (Phillips & Power, 2007) was adopted as a measure of emotion regulation strategies.

The REQ (see Appendix 10), is a 21-item self-report measure designed to assess the frequency with which individuals use both functional and dysfunctional emotional regulation strategies. Functional strategies include those which 'use information provided by the emotion, process the emotion effectively and facilitate goal-directed behaviour which promotes wellbeing' (Phillips & Power, 2007; p.14). Dysfunctional strategies are considered as those which conversely do not process emotions, potentially rejecting or blocking the emotion with negative consequences. Each category of strategy are further subdivided into 'internalised' (those occurring internally within the conscious mind) and 'externalised' strategies (those being directed externally or towards others).

The measure presents five 'internal-functional' strategies, (including reviewing thoughts and putting the situation into perspective); five 'internal-dysfunctional' strategies, (such as dwelling on thoughts and making themselves feel worse); six 'external-functional' strategies, (including talking to others and focussing on pleasant activities); and five 'external-dysfunctional' strategies, (such as taking feelings out on others and trying to make others feel bad). Participants are asked to rate the frequency with which they use each strategy on a five-point scale (scoring 1 for never using the strategy to 5 for always using it). Participants therefore generated a score for each of the strategy subscales.

The measure is relatively new compared to more widely used measures of coping strategies such as the COPE (Carver *et al.*, 1989) or the Coping Inventory for Stressful Situations (Endler & Parker, 1990; 1994) and is more coherent in terms of the emotion theories from which SPAARS has developed and was therefore considered to be more theoretically justified. Furthermore, it has been reported as a

reliable and valid measure reflected in Cronbach's alpha of between 0.66 and 0.76, as well as being highly correlated with similar emotion-focussed measures (Phillips & Power, 2007).

13.5 Trauma History & Demographics

In addition to formal measures, participants were asked to provide demographic data, which included flood-related variables, such as degree of flood damage, evacuation from their homes and experience of difficulties with insurance companies (see Appendix 11).

Participants were also asked to provide information pertaining to experience of trauma prior to or since the flood. Assessments of posttraumatic stress disorder usually include measures such as the Clinically Administered Posttraumatic Stress (CAPS) Life Events Checklist (Gray *et al.*, 2004) as the literature acknowledges that experience of prior traumatic or distressing events can increase an individual's risk of developing PTSD after subsequent events (Bremner *et al.*, 1993; Breslau *et al.*, 1999; Davidson *et al.*, 1991; Foa & Riggs 1993; Kulka *et al.*, 1990; Zaidi & Foy, 1994). Although this checklist was available, the Edinburgh Traumatic Stress Centre advised against using them in non-clinical samples due to potentially increasing the anxiety of participants. Consequently, participants were instead asked simply whether they had experienced a 'traumatic event' before or after the flood and to provide details of this if they were happy to do so.

13.6 Individual groups

Measures varied slightly between sampled groups. Both the Carlisle and Morpeth groups were presented with measures as outlined above, while the control group measures had to be modified due to their not having experienced a flood event. The survey for the control group asked individuals to complete questions pertaining to trauma history (without flood-related demographics), a single Basic

Emotions Scale pertaining to their experience of emotions within the past seven days, an Impact of Events Scale and a Trauma Symptom Inventory controlling for trauma symptoms in the general population.

13.7 Phase Two Qualitative Data

For the selection of individuals for further interviewing, a semi-structured interview plan (Appendix 12) was devised to enquire about individual's experiences of the flooding, with particular interest in:

a) establishing the appraisals made of the salient aspects of the event,

b) the related emotion (or combinations of emotion),

c) qualitative information about specific intrusive experiences, avoidance, numbing and hyperarousal,

d) more idiosyncratic symptoms (e.g. obsessive cleaning, aggression) which flood affected individuals anecdotally report as being related to emotions they experience.

14.0 Procedure

Flood maps of the affected areas in Carlisle and Morpeth were acquired from the Environment Agency, (see Appendix 3) from which affected streets were identified. Specific addresses where selected randomly using random-number generating software to select house numbers which were to be approached within each street. The Cumberland News and Morpeth Herald were contacted about publishing a short article about the research. This was intended to generate interest, seek volunteers and to provide prior warning that residents might be approached to enquire if they would participate in the study. However, neither the Cumberland News nor the Morpeth Herald responded to these

enquiries and consequently an advert was instead submitted to the papers as an alternative. The Morpeth Herald provided the advert, however, the Cumberland News would not respond to any communication nor specifically object to the ethics of the study.

Being unable to forewarn participants about the researcher calling at their addresses, it was considered to be intrusive to seek volunteers door to door and an alternative method of selection was therefore adopted. An online format of the questionnaires was devised and leaflets explaining the study were instead delivered to all households that could be identified on the flood maps as having been affected. Both those affected by flooding and those newly living within the area were asked to participate voluntarily by going to the website address provided on the leaflet (see Appendix 5). The only exclusion criteria applied were that participants were to be over the age of 18, which was cited within the advert and within the online survey form. Although a non-clinical sample was sought, participants with involvement from mental health services or taking psychotropic medication were allowed to participate if they felt able to do so.

Initially, a small number of individuals responded to the advert in Morpeth, however, it became apparent that approaching addresses in Morpeth was not only potentially intrusive but the majority of homes were still undergoing extensive reinstatement work and were uninhabited, making it impossible to select participants based on addresses. Instead, the local Flood Action Group was contacted about the research and forwarded the information on to its members to seek willing voluntary participants. The group requested questionnaires which they presented to their members who were asked to complete the measures and return them by post if they felt happy to participate.

Within the information leaflets (see Appendix 4 for Participant Information) all volunteers were informed that they could complete the questionnaires anonymously if they wished but were asked whether they would consent to be contacted to take part in a more in-depth interview if they were selected at a later date. Volunteers who consented were asked to provide their name and contact

address if they were happy to do so. All volunteers were also offered the opportunity to be entered into a prize draw upon completion of the questionnaires (it was suggested that for those responding anonymously, prize draw forms could be returned separately from questionnaire forms to prevent data from being identifiable).

Once questionnaires were completed and gathered, prize draw forms (or online prize draw forms) were detached and kept separately to prevent identification of the questionnaires. Where participants had given consent to be interviewed at a later date, consent forms and questionnaire packs for each individual were allocated a code number (in the event that an individual's data was selected for later interview, only then were codes used to identify individuals).

Measures were scored and subscale scores were derived or standardised based on individual measure guidelines. At this point it became apparent that a minority of individuals had not completed all measures and were therefore extracted from the data set. Furthermore, initial exploration of parametric assumptions within the data highlighted a number of outlying data points. On further investigation of this, a minority of individuals who generated outlying scores were found to have scored within the clinically invalid range on the Trauma Symptom Inventory. Consequently, participants with invalidated data were extracted from the final data set.

After scoring the TSI and the BES measures, it was possible to identify four participants who scored particularly highly for each of the basic emotions (anger, fear, sadness and disgust) and whose scores upon the TSI also suggested higher levels of distress. These individuals were then contacted via their preferred route (telephone, email or by letter) and it was explained that they had been selected for further interview. Individuals were then asked to contact the researcher in order to arrange a convenient time for an interview to occur, but were reminded at this time that despite giving consent to this initially, if they no longer wished to be involved, they were able to withdraw from further involvement. It was outlined that if they did not respond to the invitation within four weeks, it would be assumed that they did not wish to participate. In this event it was felt that as individuals

were identified on the basis of greater distress, they should not be asked more than once whether they wished to participate. Individuals were offered the opportunity to be interviewed in an environment in which they felt most comfortable. However, when individuals either did not attend arranged interview appointments or failed to answer calls at an arranged home visit, they were sent a further communication asking whether they wished to take part (in the event that they had forgotten) after which no further contact was made. Despite two of the participants making initial contacts to arrange further interviews, one of them did not attend the arranged interview and did not make further contact and one only wished to be interviewed informally and therefore no formal qualitative data was recorded for further analysis. Consequently, the final phase of the study was not able to be fulfilled.

15.0 Statistical Design

Firstly, chi-square comparisons of flood demographics (such as water height, possessions lost, location during the flooding and during reinstatement, insurance difficulties and experiences of prior or subsequent traumas) between the samples were made in order to establish whether geographic samples differed from one another. Subsequently, Carlisle and Morpeth samples were intended to be compared on a number of aspects:

Chi-square comparisons of the frequency of clinically significant distress on the TSI and IES within the Carlisle and Morpeth samples were followed by a comparison of the frequency of caseness between the two measures.

Emotions experienced during and after the flooding were compared between Carlisle and Morpeth samples. Other emotions experienced were also to be compared with reported ratings of fear, to explore whether fear was the primary emotion associated with the experience or other emotions were

comparably dominant, as well as comparing changes in emotional ratings from the time during the flood to the aftermath.

For further analyses, the IES and TSI rely upon symptoms currently experienced, therefore Morpeth data were extracted to more accurately reflect recent flood experience to explore the possible effect of flood-related variables upon event impact and distress symptoms.

Data pertaining specifically to the use of emotion regulation strategies were also extracted to make comparisons between the frequency of use of strategies between Carlisle and Morpeth samples. Morpeth participants were divided into groups denoting high and low use of dysfunctional strategies to explore whether strategy use was related to impact of the event or distress symptoms. Finally, comparisons between impact of the event and distress symptoms in the Carlisle sample with those in the Morpeth sample intended to explore whether symptoms might be perceived to reduce over the time since the flood was experienced.

Results

16.0 Descriptive Statistics

16.1 Respondent Demographics from raw data

Table 4: Patient Group Demographics

Area	CARLISLE		MORPETH
Group	Control	Flooded	Flooded
N	2	32	29
Age	Mean = 44 Range = 25 - 63	Mean = 51.2 Range = 25 - 63	Mean = 58.8 Range = 20 - 77
Sex	Males N =1 Females N =1	Males N =12 Females N =20	Males N =11 Females N =18

In Carlisle, 600 households received a leaflet asking them to complete the survey online or to request a paper survey to complete by post. 34 participants (5.6 per cent) from individual addresses responded by completing the online survey but as there could be more than one person living at each address that received a leaflet about the survey, the response rate could be an overestimate.

Of the 34 Carlisle respondents, two participants responded as part of the control group who live within the flooded area but who were not flooded themselves. Unfortunately, the sample was too small to be used statistically and is therefore not included in subsequent data. Consequently, the Carlisle flooded group consisted of 32 respondents in total.

In Morpeth, 200 surveys were distributed within the local community through the Morpeth Flood Action Group. A proportion of those who requested surveys subsequently admitted feeling too distressed to participate but no further information is available about these individuals. A total of 29 (14.5 per cent) people completed the survey.

16.2 Flood Demographics

16.2.1 Height of water within flooded homes

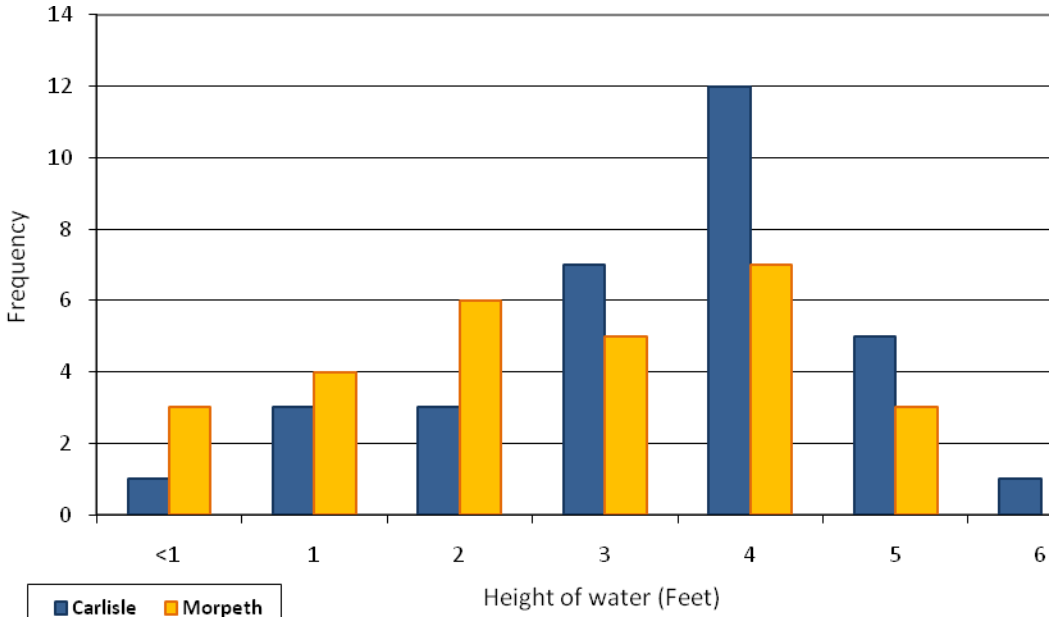

Figure 2: Variety of water heights experienced and their frequency in both flooded samples

Figure 2 shows that the majority of respondents in Carlisle and Morpeth experienced flood water of 4 feet in their homes. Distribution of water heights in both samples also broadly reflected the proportions of houses affected by various water heights within both geographic areas (Cabinet Office, 2009). The water heights collated within Figure 2 category of 'less than 1 foot' ranged from a few inches of water to 'dampness' as a result of water outside the property but which did not gather inside. The proportion of respondents experiencing water in their homes of greater than 3 feet compared to less than 3 feet did not differ significantly between Carlisle and Morpeth respondents χ^2 (1) = 2.53, p = NS.

16.2.2 Possessions lost due to flooding

All 32 participants from Carlisle reported losing their entire downstairs contents during the flood. Four of these participants reported also having lost one or more vehicles at the time.

In the Morpeth sample: 25 participants (86 per cent) lost their entire downstairs contents, one of whom also reported having lost their car; and three participants (10 per cent) sustained property damage but did not lose any possessions as water damage was limited. One participant did not indicate the degree of damage sustained. The difference in degree of possessions lost between respondents in Carlisle and Morpeth was not statistically significant (p = 0.096, Fisher's Exact test).

16.2.3 Location during flooding

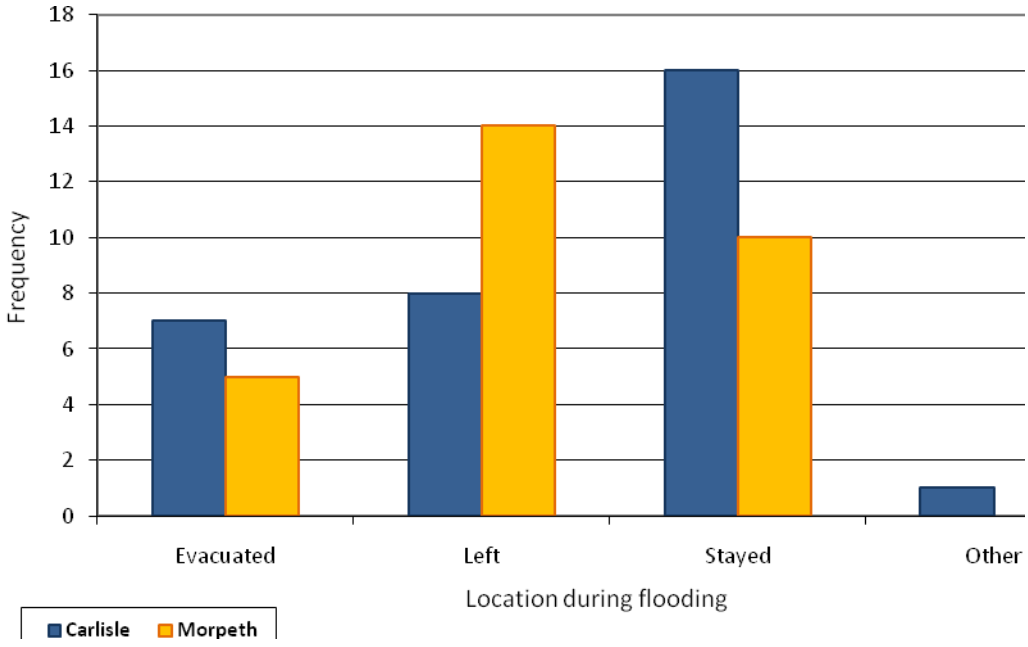

Figure 3: Locations during flooding and their frequency in both flooded samples

Figure 3 reflects that the greatest proportion of participants in Carlisle stayed in their homes throughout the flood (50 per cent) with others either leaving by choice (25 per cent) or being evacuated (21.8 per cent). One respondent reported having been on holiday and returned at the time of the flood and was therefore unable to access their home. By comparison, the greatest proportion of participants in Morpeth left their homes through choice at the time of the flood (48.2 per cent) with fewer staying throughout (34.4 per cent) or being evacuated (17.4 per cent). The proportion of respondents having left their homes, been evacuated or having stayed at home did not differ significantly between Carlisle and Morpeth respondents χ^2 (2) = 3.29, p = NS.

16.2.4 Location during reinstatement

Figure 4: Location during reinstatement and their frequency in both flooded samples

Figure 4 shows that within the Carlisle sample, 19 respondents (59.3 per cent) reported living away during reinstatement and 13 (40.6 per cent) stayed at home throughout the reinstatement, compared

to those in Morpeth of which 25 respondents (86.2 per cent) reported living away, with 4 participants (13.8 per cent) staying at home during reinstatement.

There was a significant difference between the frequency of respondents in Carlisle and Morpeth living away or staying at home during reinstatement χ^2 (1) = 5.44, $p<0.05$. Based upon expected frequencies, more participants stayed at home in Carlisle, and more lived away in Morpeth than were expected.

16.2.5 Insurance difficulties

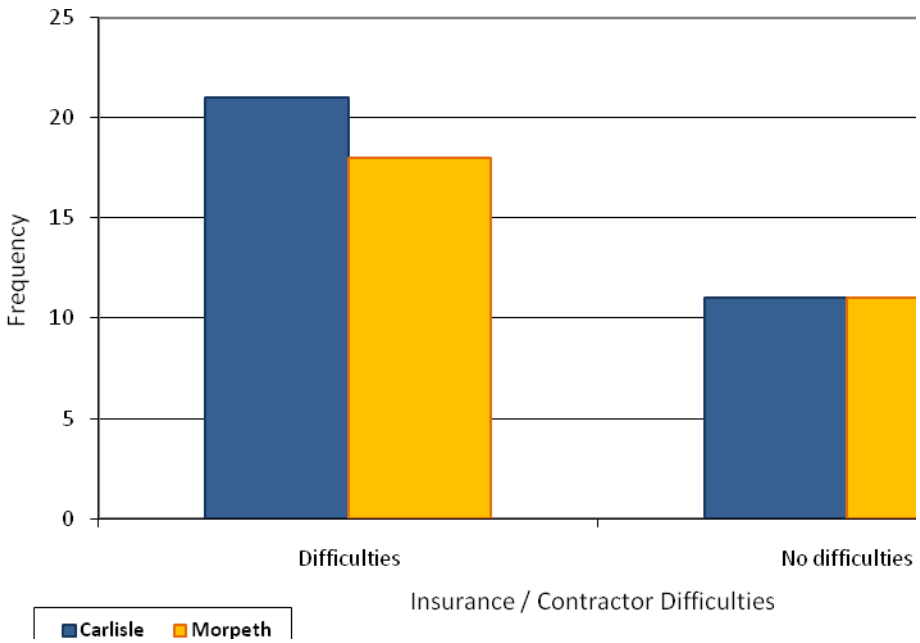

Figure 5: Experience of insurance difficulties and their frequency in both flooded samples

Figure 5 demonstrates that 21 participants in Carlisle (65.6 per cent) reported experiencing a variety of difficulties with their insurance companies and building contractors compared with 11 people (34.4 per cent) who had no difficulties in this regard. Similar proportions were noted in the Morpeth sample, with 18 participants (62 per cent) describing difficulties with insurance and building

contractors compared with 11 people (38 per cent) who had no such difficulties. The proportion of respondents experiencing difficulties with insurance companies did not differ significantly between Carlisle and Morpeth respondents χ^2 (1) = 0.083, p = NS.

16.2.6 Experience of trauma before flood

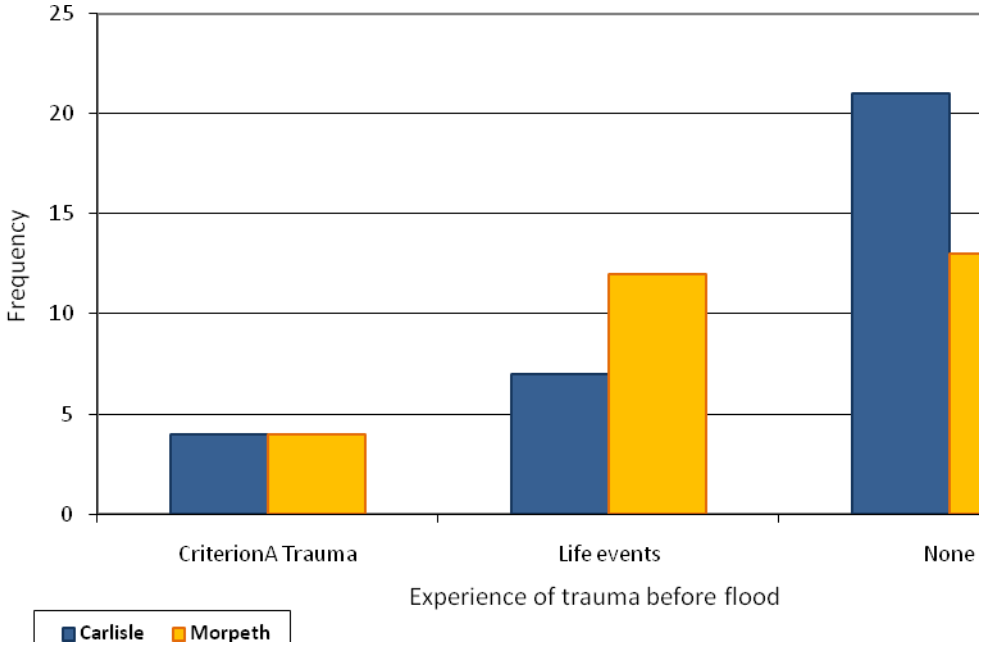

Figure 6: Experience of pre-flood life events and their frequency in both flooded samples

When asked to disclose previous traumatic experiences at any time within their lives as an indicator of pre-flood PTSD risk factors, Figure 6 illustrates the frequency of the type of events reported by participants. Within the Carlisle sample, 4 respondents (12.5 per cent) reported experiencing traumatic events which fulfil Criterion A for potential to produce symptoms of posttraumatic stress disorder (APA, 2000). These experiences included, a) experience of a serious road traffic accident and childhood cancer, b) exposure to an IRA attack in Northern Ireland, c) exposure to an earthquake in India, and d) experiences as a veteran of the Bosnian and Gulf Wars. A further 7 respondents (21.8

per cent) reported distressing events at some time in their lives which they subjectively described as 'traumatic' in nature. However these events included experiences such as divorce, bereavement or stress at work, but these events did not pose a risk of death or injury and therefore do not fulfil Criterion A as outlined by DSM-IV.

By comparison, within the Morpeth sample, 4 respondents (13.7 per cent) also reported Criterion A experiences including, a) finding their child having taken an overdose, b) serious road traffic accident, c) being involved in an armed arrest of an escaped offender, and d) as a pedestrian having been hit by a car. A further 12 respondents (41.3 per cent) reported distressing life events including violent relationships, concerns about relatives who served during the Falklands War, and childhood abuse but which do not constitute Criterion A events.

The proportion of respondents reporting traumatic or difficult life events did not differ significantly between Carlisle and Morpeth respondents χ^2 (2) = 3.05, p = NS.

16.2.7 Experience of trauma since flood

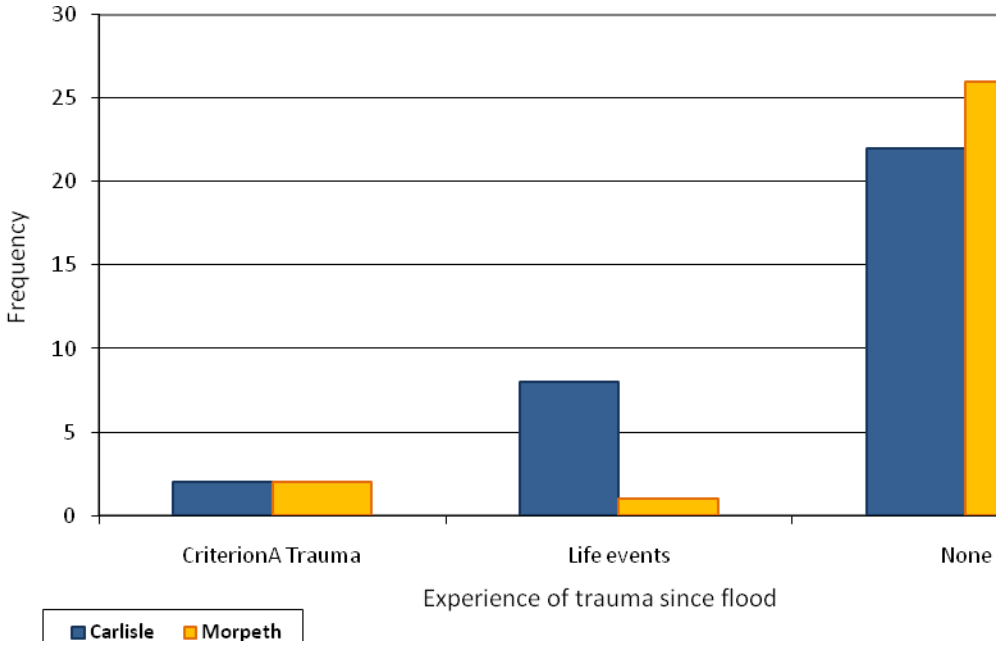

Figure 7: Experience of post-flood life events and their frequency in both flooded samples

Figure 7 reflects that within the Carlisle sample, 2 participants (6.2 per cent) reported Criterion A traumas since the flood, including, a) serious road traffic accident and b) experiences as a veteran of Afghanistan conflict. A further 8 participants (25 per cent) reported distressing life events including divorce and bereavement. By comparison, 2 participants within the Morpeth sample (6.8%) reported Criterion A traumas since the flood, involving serious road traffic accidents. A further participant reported experience of distressing illness but this did not fulfil potential to generate symptoms of PTSD according to DSM IV (APA, 2000). The proportions of experiences of Carlisle and Morpeth respondents since the flood did not differ significantly χ^2 (2) = 5.64, p = NS.

16.3 Descriptive Statistics - Measures

Table 5: Descriptive Statistics for Measures used within both populations

		Area	CARLISLE		MORPETH	
		Group	Flooded		Flooded	
Subscales	Score Range		Mean	S.D.	Mean	S.D.
Basic Emotions Scale - During Flood (BES1)	1 (not at all) – 7 (very often) 4 or above indicates degree of clinical relevance	Anger1	4.07	1.70	4.20	1.61
		Sadness1	3.99	1.69	3.88	1.98
		Disgust1	1.67	0.87	2.02	1.15
		Anxiety1	4.62	1.52	4.77	1.71
		Happiness1	2.68	1.56	2.56	1.52
Basic Emotions Scale – After Flood (BES2)	1 (not at all) – 7 (very often) 4 or above indicates degree of clinical relevance	Anger2	5.08	1.73	4.94	1.29
		Sadness2	3.83	1.59	4.14	1.83
		Disgust2	1.56	0.70	2.21	1.47
		Anxiety2	4.74	1.72	5.15	1.60
		Happiness2	3.79	1.62	3.10	1.43
Impact of Events Scale – Revised (IES-R)	1 (not distressing) – 4 (extremely distressing): >2 on subscales / >6 on IES Total indicates clinical relevance	Avoidance	0.92	0.85	1.27	0.91
		Intrusion	1.0	0.95	1.71	0.99
		Hyperarousal	0.83	0.89	1.51	0.92
		IES-R Total	2.75	2.31	4.56	2.61
Regulation of Emotions Questionnaire (REQ)	1 (never use) – 5 (always use strategy) >3 suggests high use of strategy	Internal-Dysfunctional	1.94	0.63	1.91	0.74
		Internal-Functional	3.11	0.69	2.91	0.34
		External-Dysfunctional	1.33	0.26	1.39	0.34
		External-Functional	2.66	0.70	2.62	0.76
Trauma Symptom Inventory (TSI)	Standardised scores range from 35 to 100 Invalid scores: ATR >90, RL >73, INC >75	Atypical Responses ATR	50.93	12.12	49.38	8.97
		Response Level RL	46.51	9.72	44.55	7.76
		Inconsistent Response INC	53.26	9.18	53.45	10.39
	Raw scores 0 (never experienced) – 3 (often experienced) Standardised scores range from 35 to 100 Standardised scores >65 suggest clinical significance	Anxious Arousal AA	52.29	11.39	59.83	13.3
		Depression D	52.22	8.98	58.76	12.25
		Anger / Irritability AI	49.16	8.08	56.31	10.89
		Intrusive Experiences IE	54.54	12.10	55.65	10.38
		Defensive Avoidance DA	52.58	9.64	54.14	9.46
		Dissociation DIS	57.03	14.20	58.45	14.49
		Sexual Concerns SC	49.71	8.48	50.52	8.63
		Dysfunctional Sexual Behaviour DSB	45.64	2.23	47.03	4.66
		Impaired Self Reference ISR	54.06	12.22	57.52	13.73
		Tension Reduction Behaviour TRB	47.74	6.62	53.03	9.37

Table 5 presents means and standard deviations for all outcome measures presented to Carlisle and Morpeth samples. Sample score ranges and clinically significant cut-offs are presented for comparison.

17.0 Exploration of assumptions for analyses

Firstly, in investigating the data visually, a number of participants did not complete all measures and were therefore extracted from the data set.

17.1 Assumption of Normal Distribution

Kolmogorov-Smirnov analyses were used to establish whether the Carlisle and Morpeth samples violated the assumption of normal distribution and therefore whether data can be used in parametric analysis. To control for the potential increase in Type I error rate due to multiple testing over a number of variables, the required alpha level was adjusted to a more stringent level using the Bonferroni correction; the standard alpha level ($p<0.05$) in which normality was tested for 31 data variables per sample would need to be adjusted to a significance of $p<0.0016$ in order for samples to be considered significantly different from a normal distribution. (See Appendix 13 for K-S test statistics). K-S analysis for Carlisle and Morpeth samples showed that all variables were not significantly different from a normal distribution based on the adjusted alpha level.

17.2 Exploring skewness and kurtosis

To explore the sample distributions in more detail, the degree of skewness and kurtosis was calculated (see Appendix 14 for Carlisle skewness and Appendix 15 for Morpeth skewness).

The Carlisle sample showed greater overall skewness reflected in more variables reaching significance for skewness than the Morpeth sample, which was potentially reflected in the low response rate and greater potential for a highly self-selected sample within Carlisle. The Morpeth sample however appeared to be more representative and varied in those who chose to participate,

reflected in fewer significantly skewed distributions compared to Carlisle. Due to the degree of skew for both samples, the data were subjected to natural log transformation. However, this had no effect and therefore raw data are presented.

Stem-and-leaf plots of the data identified a number of outliers with particularly high scores within the validity measures of the Trauma Symptoms Inventory. Importantly, the TSI outlines clinical cut-off points above which participant responses are considered to be clinically invalid. Closer examination of these individuals' scores also showed that those generating outlying values above the clinically valid cut-offs for the TSI also generated outlying scores on other measures with the potential to significantly skew the data set. Consequently, data pertaining to individuals who produced invalidated outliers (n=4) were extracted from the data set before proceeding with further analyses. This reduced the Carlisle sample to 31 participants and the Morpeth sample to 26.

17.3 Assumption of Homogeneity of Variance

As part of the analysis of flood data involved comparison of two independent groups, the Levene's test for homogeneity of variance between these two groups was conducted to ascertain whether the assumption of equal variances between these groups was upheld (see Appendix 16 for test statistics).

Based upon an adjusted significance for multiple testing ($p<0.0016$), only two variables were significantly different in their variance between both groups; variance for disgust scores pertaining to the aftermath of flooding were significantly different $F(1,50) = 15.60$ $p<0.0001$; as were scores for use of internal-functional emotion regulation strategies, $F(1,50) = 14.82$ $p<0.0001$.

However, as the majority of measures reflected distributions of equivalent variance, deviation from this in the anomalous variables may reflect specific deviations in participant responses on these measures (for example, disgust ratings are difficult to accurately achieve due to the nature of the measure). Therefore, as the majority of variables fulfilled the assumptions of normal distribution

and homogeneity of variance, it was assumed that both flooded samples could be appropriately subjected to parametric testing.

18.0 Investigating Study Hypotheses

18.1 Question 1 – Degree of clinically significant distress

18.1.1 Hypothesis a) A smaller proportion of individuals might experience symptoms of distress on the TSI when compared to the levels of distress reported in previous flooding studies

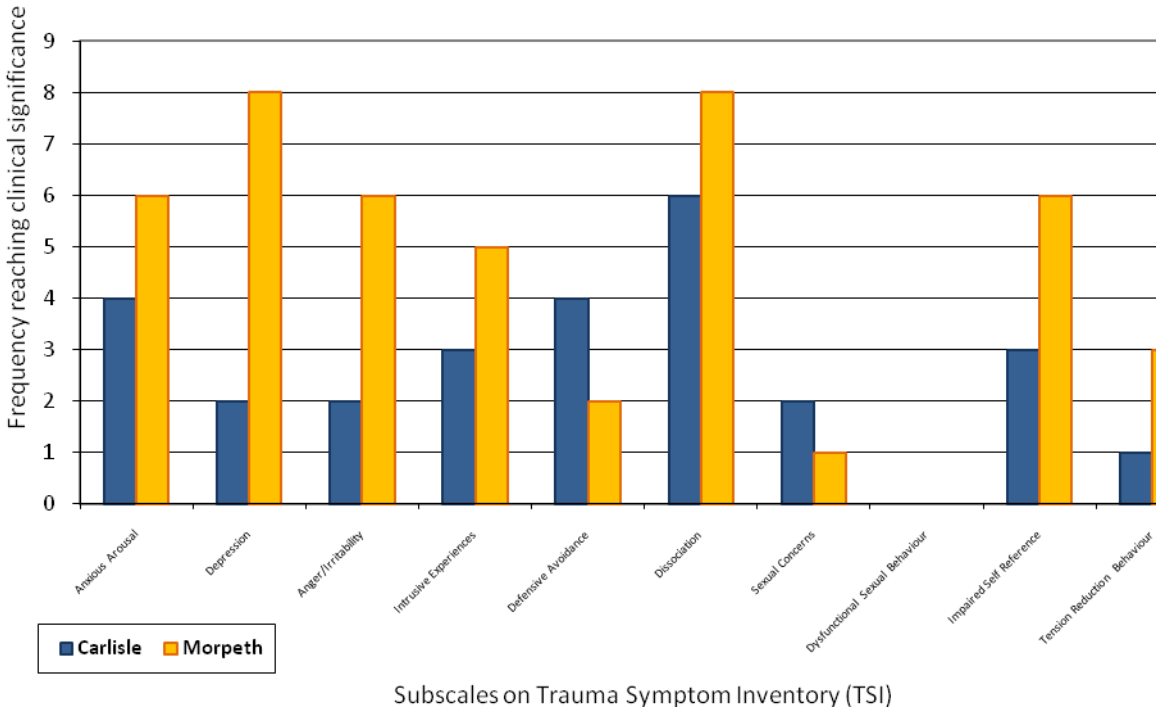

Figure 8: Frequency of participants reaching clinical caseness (over 65) on standardised scores for each of the subscales of the Trauma Symptom Inventory for both samples

Figure 8 reflects the number of both Carlisle and Morpeth respondents who reached clinical significance on the Trauma Symptom Inventory (TSI) subscales. Looking more closely at the depression subscale for example, (which is easier to draw comparisons with previous literature regarding specific depression symptoms), 8 out of the 26 respondents from Morpeth (30.7 per cent)

obtained a score suggesting clinically relevant depression, compared to 2 out of the 31 respondents from Carlisle (6.4 per cent) with clinically relevant depression scores. The score for depression within the Morpeth sample is therefore comparable with the highest prevalence of moderate depression reported in previous literature (16-33 per cent) (Tapsell & Tunstall, 2008). The greatest frequency of clinically relevant scores in the Carlisle sample occurred for symptoms of dissociation (n=6 or 19.3 per cent respondents), compared to 8 respondents (30.7 per cent) scoring within the clinically relevant range on this subscale from the Morpeth sample.

It would appear that a considerable number of participants reported experiencing clinically distressing symptoms. However, it is unclear from these data how many actual individuals this affects (for example, are the same 8 respondents in Morpeth experiencing clinically relevant depression and dissociation, or are there in fact 16 individuals, of which 8 experience depression symptoms and 8 experience dissociation?) To clarify this question, it is potentially more useful to judge distress based upon how many individuals experience clinically relevant symptoms on more than one subscale (see Figure 9 below).

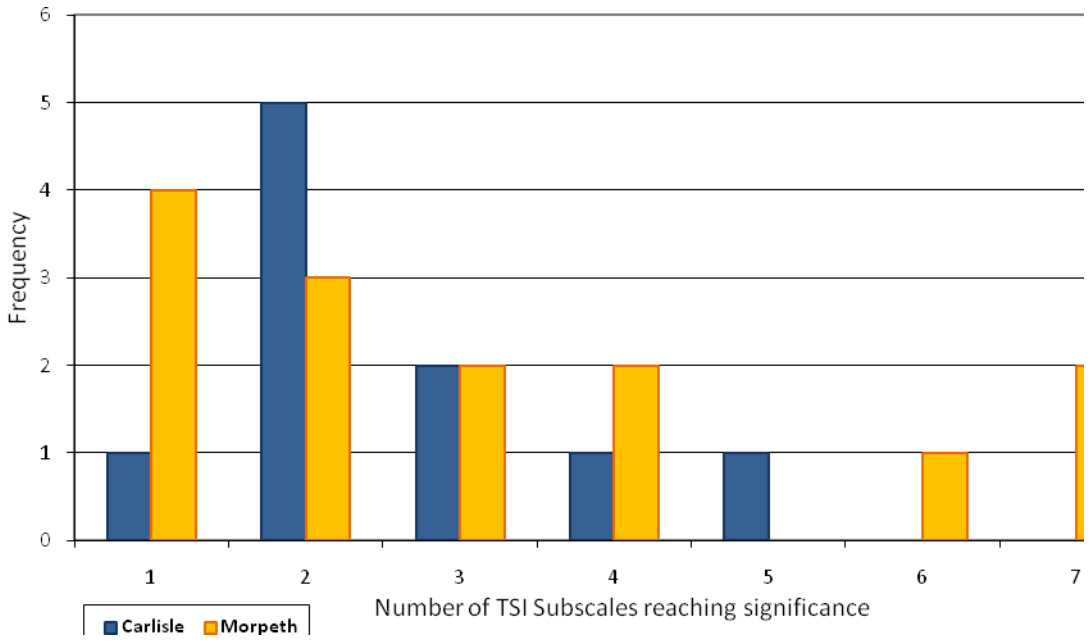

Figure 9: Number of TSI subscales that participants reach significance for and frequency of each category for both samples

Figure 9 presents the frequency with which individuals produce clinically significant scores on more than one subscale, of which it is evident that the greatest frequency of Morpeth participants (15.3 per cent) report clinical significance on one subscale and the greatest frequency of Carlisle participants (16.1 per cent) report clinical significance on two subscales. However, the difference in Carlisle and Morpeth samples in the number of individuals with two or less clinically relevant subscale scores and three or more clinically relevant scores was not statistically significant ($p = 0.696$, Fisher's Exact test).

Nevertheless, 53.8 per cent Morpeth sample (n=14) reach caseness on one or more variables, reducing to 38.4 per cent of the total sample (n=10) reaching significance on two or more variables. This would appear to suggest that overall distress based upon two or more clinically symptomatic variables remains comparable with rates of distress found in previous samples (Department of Health, 1998).

The Department of Health (1998) reported that 34 per cent of samples studied continued to have difficulties (as measured by the General Health Questionnaire) even after all reinstatement was completed, which is broadly comparable with the Carlisle sample within this study. 32.3 per cent of Carlisle participants (n=10) generated clinically significant scores on one or more variables on the TSI which would appear to be broadly comparable with previous estimates, although it is not possible to make comparisons about the nature of the difficulties reported.

18.1.2 Hypothesis b) A greater proportion of individuals will experience clinically relevant symptoms of impact on the IES compared to levels of distress on the TSI

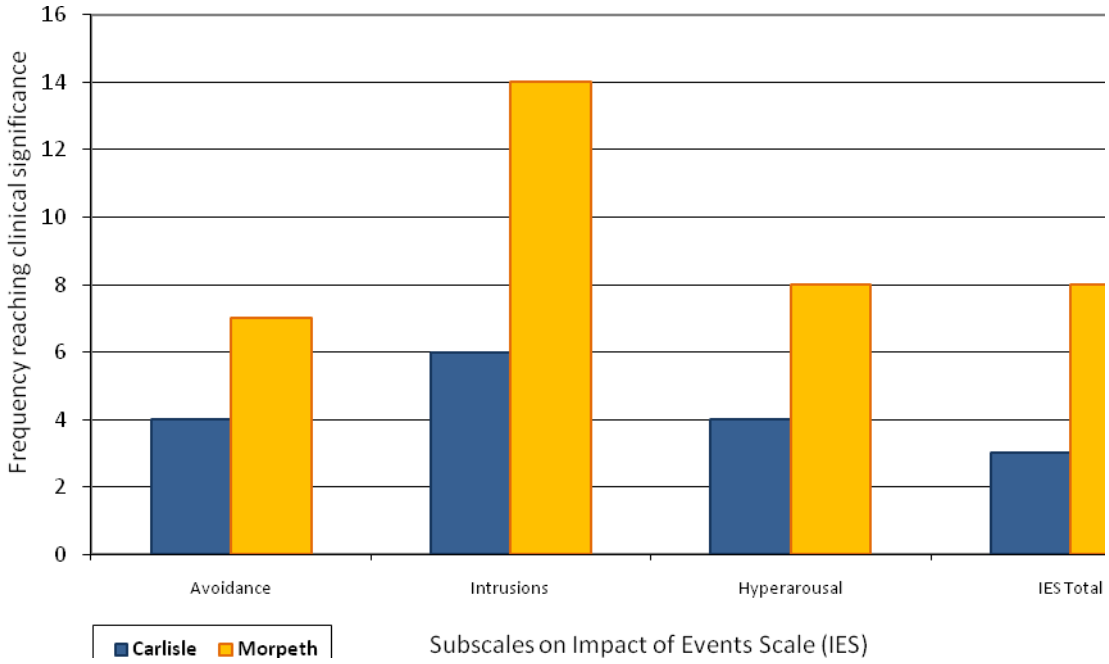

Figure 10: Frequency of participants reaching clinical caseness (over 2) on subscales or caseness on Total IES scale (over 6) on the Impact of Event Scale for both samples

Figure 10 reflects that a number of both Carlisle and Morpeth respondents reach clinical significance on the Impact of Events subscales. The greatest frequency of Morpeth participants (14 respondents, 53.8 per cent) report clinically relevant intrusions scores compared with 6 respondents from Carlisle (19.4 per cent) reporting clinically significant levels of intrusions. Despite apparent differences between frequencies for Carlisle and Morpeth, the number of individuals with clinically relevant avoidance and intrusions ($p = 0.509$, Fisher's Exact test) or hyperarousal and IES Total scores ($p = 0.555$, Fisher's Exact Test) were not significantly different. Interestingly, results from both the IES and TSI suggest that the proportion of those experiencing clinically significant impact and distress do not differ significantly between groups who experienced flooding four years ago compared to those who experienced more recently.

As previous studies have not specifically measured these IES variables (and as many of them classify them as indicative of PTSD alone), it is not possible to directly compare the proportion of those

affected in these flooded samples with samples from previous literature. However, literature suggests that in disaster samples, PTSD prevalence or related distress is approximately between 32 per cent (de la Fuente, 1990) and 29 per cent (Norris *et al.*, 2001). In considering the IES total score as reflective of overall PTSD symptomatology, 8 participants from Morpeth (30.8 per cent) and 3 participants from Carlisle (9.7 per cent) fall within the clinically significant range. Consequently, it would appear that Morpeth participants are comparable with previous studies into the prevalence of symptoms that are characterised as posttraumatic in nature.

In addition, in terms of the SPAARS model, it would also be hypothesised that a greater proportion of participants should experience higher IES scores (as is related to normal resolution of discrepancies) than should experience TSI scores (related to psychological difficulties).

For ease of comparison between these two measures, the total IES score (mean of impact scores) was compared against a mean score calculated for TSI subscales (mean of psychological distress scores). Carlisle and Morpeth samples were combined into one sample which was divided into 'low', 'moderate' and 'high' scorers upon each scale (see Figure 10): 'Low' scores on IES total referred to means of 0-3 inclusive, 'moderate' scores referred to means greater than 3 to less than 6, and 'high' scores were means greater or equal to 6 (indicative of clinical significance). In addition, 'low' scores on the TSI referred to mean scores less than or equal to 55, 'moderate' scores referred to those greater than 55 or less than 64 inclusive, and 'high' scores referred to means of 65 or greater (indicating clinical significance.)

A number of data points were missing for both the IES (n=7 incomplete) and TSI (n=6 incomplete) which were not included in this comparison. The remaining frequencies are shown in Figure 11.

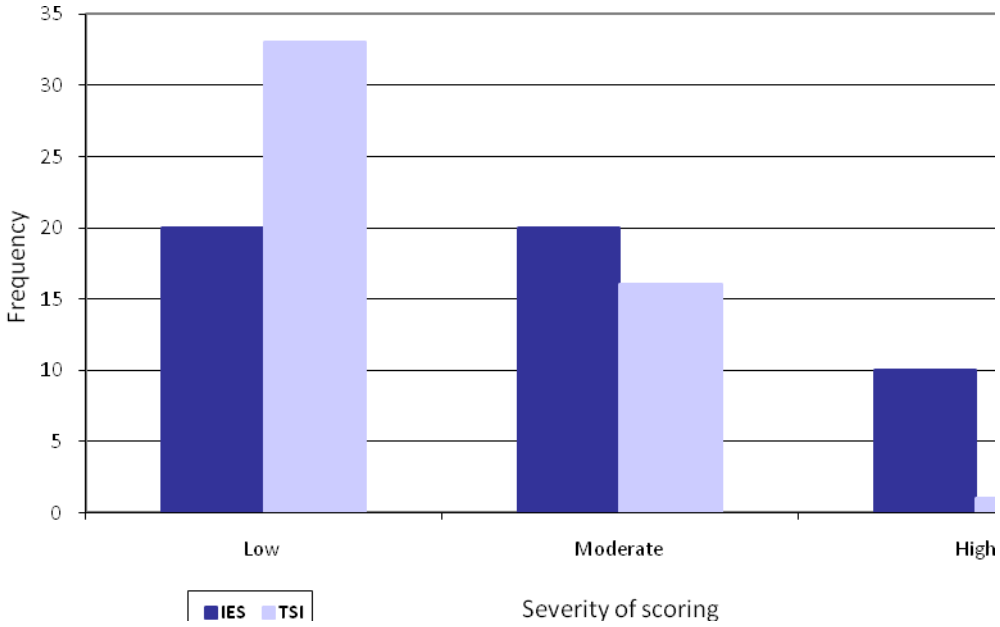

Figure 11: Comparison of frequencies of low, moderate and high scores on IES and TSI for combined sample

Figure 11 visually represents that scoring 'low' on the TSI was notably more frequent than scoring low on the IES, suggesting that impact scores might tend to be higher than TSI scores. Furthermore, more participants within the moderate and high categories scored highly on the IES than on the TSI. Importantly, χ^2 comparison of these frequencies suggests a significant difference between the groups; χ^2 (2) = 10.997, $p < 0.005$ (where frequency of high IES scores was greater than expected) suggesting that Criteria B, C and D symptoms within DSM IV are significantly more common than other symptoms of psychological distress.

18.2 Question 2 – Emotions associated with flooding

18.2.1 Hypothesis a) Other emotions will be experienced during the flooding in addition to fear (and possibly to a similar degree)

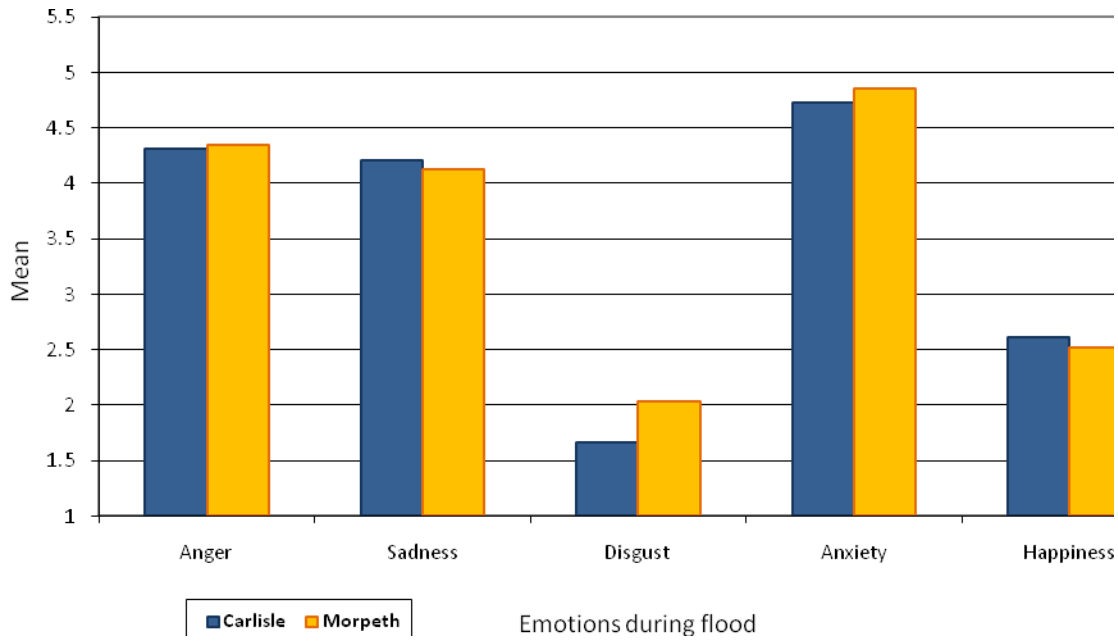

Figure 12: Mean ratings of basic emotions during the flood for both samples

Figure 12 suggests little difference between Carlisle and Morpeth samples in terms of each emotion experienced at the time of flooding. Indeed, there were no significant differences between the samples on emotions: (anger t (93) = 0.353, p>0.05; sadness, t (93) = 0.187 p>0.05; anxiety t (93) = 0.198 p>0.05 and happiness t (93) = 0.761 p>0.05). The only exception was that disgust during the flood rated by Morpeth participants, was significantly higher (mean = 2.033) than for Carlisle participants (mean = 1.644), t (93) = 2.241 p<0.05. However with an adjusted significance for multiple testing (n=5) (p=0.01), this difference was not significant (see Appendix 17).

18.2.2 Hypothesis b) Other emotions will be experienced after the flooding in addition to fear (and possibly to a greater degree in the aftermath).

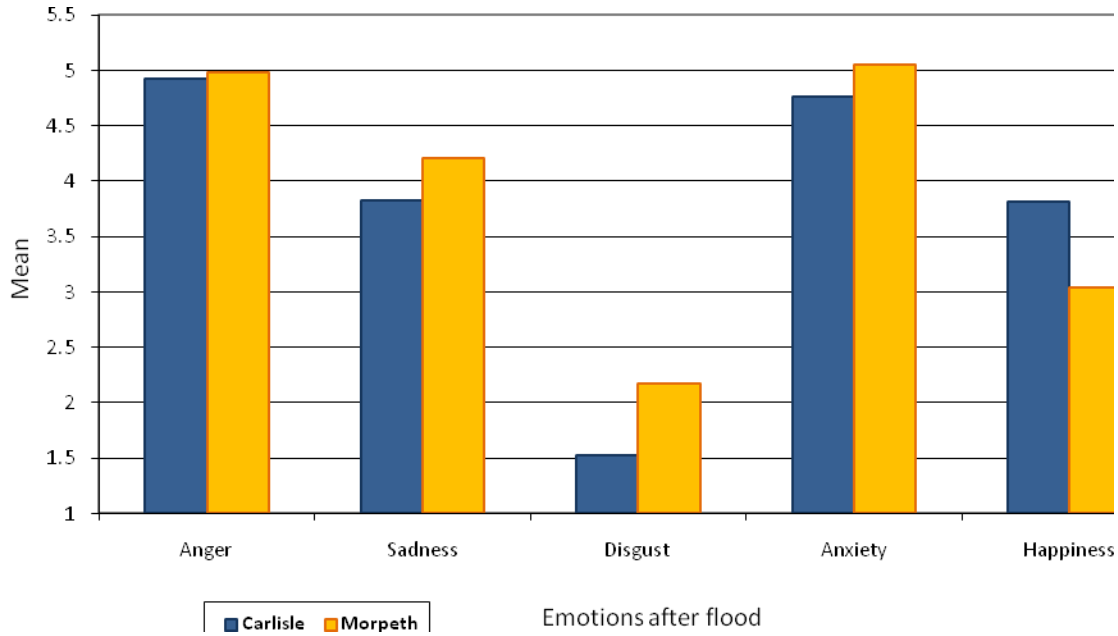

Figure 13: Mean ratings of basic emotions after the flood for both samples

Figure 13 also demonstrates little difference between Carlisle and Morpeth samples in their emotions experienced after the flood. Indeed independent samples t-tests (Appendix 18) showed no significant difference between samples on emotions experienced: (anger t (93) = 0.862 p = NS; anxiety, t (93) = 1.383 p = NS or happiness t (93) = 1.703 p = NS). The Morpeth sample showed significantly higher sadness ratings after the flood than the Carlisle samples; t (93) = 2.144 $p<0.05$, although adjustment for multiple testing rendered this difference non-significant. However, disgust was significantly higher within the Morpeth sample (mean = 2.175) compared to the Carlisle sample (Mean = 1.521); t (93) = 4.915 $p<0.001$ despite the adjusted significance level.

Secondly, literature has suggested that difficulties within the aftermath can be more significant that the event itself and we might therefore expect emotion ratings to at least remain as high if not increase in the aftermath. Paired samples t-tests demonstrated no significant change in ratings of anger t (94) = 1.775 p = NS or anxiety t (94) = 0.057 p = NS between the flood and the aftermath. When significance was adjusted for multiple testing, there was also no significant change between feelings

of sadness t(94) = 2.542 p = NS or disgust t (94) = 0.057 p = NS between the event and the aftermath. However, happiness increased significantly between the event (mean=2.74) and the aftermath (mean=3.54) t (94) = 6.484 p<0.001. Therefore it appeared that negative emotions did not increase in the aftermath as previous literature might suggest but that they remain consistent, with only happiness increasing significantly once the event is over (see Appendix 18).

18.3 Question 3 – Effects of personal / flood variables

18.3.1 Hypothesis a) Flood variables will not have a significant effect on impact or distress measures

In terms of test measures, the TSI and IES reflected current symptomatology, but the Carlisle sample had more time for symptoms to remit than the Morpeth sample. Consequently, for the purpose of looking more closely at flood-related variables, Carlisle sample data were considered less reflective and therefore Morpeth data were used exclusively in the following comparisons. As the Morpeth sample fulfilled the assumption for normal distribution, parametric analyses were adopted.

18.3.1.1 Height of water

When Morpeth data were divided by experience of flood water of 3 feet or less (n=15) compared with 4 feet or more (n=8) there were no significant differences between emotions experienced during the flood, emotions experienced after the flood, scores for intrusions, avoidance or hyperarousal or mean TSI score, (see Appendix 19 for analysis data).

18.3.1.2 Location during flooding

When Morpeth data were subdivided into those who left their homes during the flood (n=14) compared with those who stayed in their homes (n=9) no significant differences were found between emotions experienced during the flood, emotions experienced after the flood, scores for intrusions, avoidance or hyperarousal or mean TSI score (see Appendix 20 for analysis data).

18.3.1.3 Location during reinstatement

When Morpeth data were divided into those who left their homes during the reinstatement (n=3) and those who stayed in their homes (n=20), it was not possible to make a statistical comparison between the groups. The study therefore cannot quantitatively explore whether location during reinstatement had an impact upon post-flood distress.

18.3.1.4 Insurance Difficulties

When Morpeth data was divided into those who experienced difficulties with insurance companies (n=15) compared with those who didn't (n=8) there were no significant differences between emotions experienced during the flood, emotions experienced after the flood, scores for intrusions, avoidance or hyperarousal or mean TSI scores, (see Appendix 21 for analysis data).

18.3.1.5 Trauma before the flood

When Morpeth data was subdivided into those who experienced Criterion A events before flood (n=4), distressing life events before flood (n=8) and those who experienced no pre-flood difficult events (n=11) it was not possible to make a statistical comparison between the groups. The study

therefore cannot quantitatively explore whether trauma before the flood had an impact upon post-flood distress.

18.3.2 Hypothesis b) Dysfunctional emotion regulation strategies will have a significant effect upon impact and distress compared with flood variables

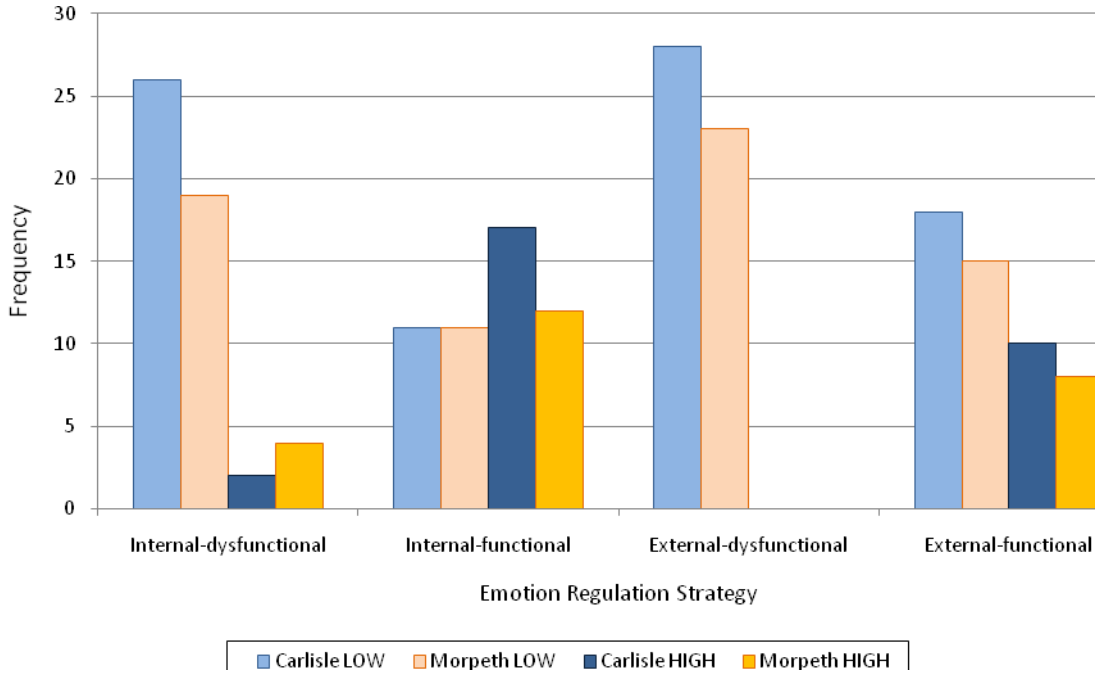

Figure 14: Frequency of use of emotion regulation strategies, in terms of low versus high use for both samples.

Strategies were subdivided into the measured subscales (i.e. internal-dysfunctional, internal-functional, external-dysfunctional and external-functional strategies) and further categorised into those who rate low use and those who rate high use of each (based upon a score of less than 3 indicating 'low' use and 3 or greater indicating 'high' use).

Despite some visual differences, Carlisle and Morpeth samples did not differ significantly in the frequencies of reporting use of internal-dysfunctional strategies ($p = 0.24$, Fisher's Exact test); internal-functional strategies ($p = 0.31$), external-dysfunctional-strategies ($p = 1.0$) or external-functional strategies ($p = 0.58$) showing general consistency between the samples in how affected populations tend to regulate affect.

It was hoped that use of strategies could be analysed statistically to explore whether use of emotion regulation strategies were predictive of post-flood distress, however there were too few data from the Morpeth sample for statistical comparisons to be possible.

18.3.3 Hypothesis c) Distress should reduce over time (therefore be significantly higher in a sample flooded more recently).

Within this study, Carlisle data were gathered as a pseudo-longitudinal comparison group to compare with more recent experiences in Morpeth. As noted, Carlisle and Morpeth did not differ significantly in terms of the emotional experience they reported during or after the flood, suggesting relatively similar flood experiences.

However, when impact and distress scores were compared directly, analysis of variance showed that although Carlisle and Morpeth samples do not differ significantly in terms of ratings of avoidance on IES $F(1,55) = 2.745$ $p = NS$, the samples differed significantly in terms of ratings of intrusions and hyperarousal on IES and overall TSI mean scores.

Specifically, the Morpeth sample showed significantly higher intrusions (mean = 2.28) compared to Carlisle (mean=1.73) $F(1,55) = 6.382$ $p<0.05$; significantly higher hyperarousal (mean = 2.07) compared with Carlisle (mean =1.56) $F(1,55) = 6.661$ $p<0.05$; and significantly higher TSI mean scores (mean = 57.74) compared with Carlisle scores (mean = 53.090) $F(1,55) = 6.347$ $p<0.05$, suggesting that if the samples were comparable at the time of flooding, it would appear that distress reduces significantly over time since the event (see Appendix 22).

18.4 Question 4 – Qualitative Interviews

The final aim of the study was to identify participants with high scores for emotional experience and distress to qualitatively explore possible relationships between these variables. However it was only

possible to identify four participants who had consented to further interviewing and only one respondent agreed to participate but was uncomfortable about being formally interviewed. Consequently, no data are available for further qualitative enquiry and it was not possible to fulfil this aim of the study.

Discussion

19.0 Summary of findings

Comparison of Carlisle and Morpeth samples showed no differences between groups in terms of variables such as water height, possessions lost, being at home or evacuated during flooding, difficulties with insurance companies or experience of traumatic events prior to or since the flood. However, more participants stayed in their homes during reinstatement in Carlisle than stayed at home within the Morpeth sample and the Morpeth sample reported significantly greater feelings of disgust after the flood than Carlisle participants.

On the Trauma Symptom Inventory there was no difference between Carlisle and Morpeth in the proportion of clinically significant scores. Over half of the Morpeth sample reached clinical significance on one or more measures of distress, and over a third on two or more variables. In addition, over a third of Carlisle participants generated clinically significant scores on one or more variables despite four years passing since the flood occurred.

There was no difference between Carlisle and Morpeth on Impact of Events subscales which reflect characteristic PTSD sequelae (intrusions, avoidance or hyperarousal). However, both samples demonstrated significantly more high impact scores (IES) compared to other psychological symptoms of distress (TSI).

Carlisle and Morpeth did not differ in terms of their emotional experience during or after flooding, with anxiety, anger, sadness and disgust all reported during these times. In the aftermath of flooding, emotions reported did not change significantly, but happiness ratings increased significantly once flooding had subsided.

Within the Morpeth sample, findings suggested that there were no significant differences in emotions experienced, IES scores or TSI symptoms based upon differences in flood variables. There were also no differences in distress between those who had experienced Criterion A events, compared to distressing life events or no pre-flood difficulties. Nevertheless, despite no differences between Carlisle and Morpeth samples, distress measured by the TSI and IES suggested reduced symptoms in the Carlisle sample, suggesting recovery over time.

Finally, there were no differences in emotion regulation strategies between Carlisle and Morpeth samples, with higher use of functional strategies (both internal and external) compared to dysfunctional strategies and greater use of internal compared to external strategies. However, high use of internal-dysfunctional strategies were related to significantly higher reports of intrusions, hyperarousal and distress measures on the TSI compared to low use of these strategies.

19.1 Findings related to study hypotheses and previous literature

19.1.1 Question 1: Hypothesis a) A smaller proportion of individuals might experience clinically relevant symptoms of distress on the TSI when compared to the levels of distress reported in previous flooding studies

Previous studies provide a variety of prevalence estimates for depression, anxiety and PTSD in flooded populations, (de la Fuente, 1990; Norris *et al.*, 2001; Tapsell & Tunstall, 2008) many of which suggest difficulties in a considerable proportion of samples studied. Department of Health (1998) also indicated that 34 per cent of flood-affected individuals displayed clinically significant impairment in psychological health on measures such as the GHQ-12, even after all reinstatement was completed, which was higher than would be expected for the population in general (Department of Health, 1998). However, due to concerns about over-classification of disorders or over-pathologising of potentially normal distress, this study identified only those who scored within the clinically significant range for distress. As such, it was considered that Carlisle and Morpeth samples might show a comparatively reduced prevalence of symptoms on the TSI. Findings in fact reflected that both flooded samples

were broadly comparable with Department of Health (1998) estimates and suggested detrimental effects of flooding upon psychological wellbeing to some degree above that expected within the general population.

Although clinically significant scores were more prevalent than expected and therefore did not support the hypothesis, it was valuable to have found this within a study which was not seeking to pathologise post-flood distress. Consequently, findings indicate that flooding is an event in which a considerable number of those affected might experience clinically significant levels of distress in some form. However, identification of specific causes or nature of distress was not possible from these data; and it is difficult to identify from TSI subscales whether caseness on one scale is sufficient to consider difficulties to be of actual clinical relevance, or indeed how many subscales would need to reach caseness for this to be the case. Caution is therefore applied in suggesting the diagnostic nature or presentation of the distress identified.

19.1.2 Question 1: Hypothesis b) A greater proportion of individuals will experience symptoms of impact on the IES compared to levels of distress on the TSI

Previous literature suggests that in disaster samples, prevalence of posttraumatic distress is estimated at around 30 per cent (de la Fuente, 1990; Norris *et al.*, 2001). Although not seeking to establish existence of PTSD, this study compared such prevalence against individual Total IES scores (indicating the overall presence of symptoms 'characteristic' of PTSD, i.e. intrusions, avoidance and hyperarousal symptoms). In this regard 30 per cent of the Morpeth sample fell within the clinically significant range which was comparable with previous prevalence estimates. However, the SPAARS model presents these symptoms as being related to schematic adjustment and discrepancy resolution (Dalgleish & Power, 2004; Power & Dalgleish, 2008) and symptoms were therefore not considered in this study as indicating the presence of PTSD per se. Consequently, considering these symptoms to be more 'normal' when compared to more 'disordered' reactions (as measured by the TSI), it was

hypothesised that a greater proportion of participants should experience higher IES scores (related to normal adjustment) than should experience TSI scores (related to psychological difficulties).

Although this hypothesis was driven by theoretical concepts and not supported by previous literature, there was a significantly greater proportion of high IES scores compared to high TSI scores, and significantly fewer low IES scores compared to low TSI scores within this study. This discrepancy tentatively supported the SPAARS hypothesis, suggesting that Criteria B (intrusions), C (avoidance and numbing) and D (hyperarousal) symptoms within DSM IV (which SPAARS presents as being related to normative schematic recovery) are found to a greater degree than other posttraumatic measures of distress. This would appear to go some way towards supporting the SPAARS suggestion that common occurrence of impact does not equate to common occurrence of disorder, which is not accounted for in the bulk of current PTSD literature. Unfortunately from these data, it is not possible to draw definitive conclusions on the nature and functions of reported impacts in terms of the SPAARS framework. Nevertheless, equal caution should be given to the conclusions drawn within previous literature about the presence of impact symptoms being indicative of PTSD and although findings might suggest normalisation of post-disaster reactions, they do not suggest that genuine posttraumatic stress is not a possible outcome of flood experience.

19.1.3 Question 2: Hypothesis a) Other emotions will be experienced during the flooding in addition to fear (and possibly to a similar degree)

There is little previous literature on the nature of emotions experienced at the time of flooding, and there is particular emphasis upon retrospective feelings towards the event derived from subjective clinical assumptions. In addition, previous literature focuses on posttraumatic stress reactions, which DSM-IV defines as an anxiety-disorder (APA, 2000) thereby negating experience of other emotions. However, the SPAARS model hypothesises that emotions other than fear might feature significantly

within traumatic experiences and therefore poses a challenge to previous literature about the emotional nature of such events.

Interestingly, findings suggested that all four negative basic emotions: anger, fear, disgust and sadness, featured during flood experiences, which goes some way to supporting the SPAARS hypothesis that other emotions than just fear might be significant during flood experiences. Sadness and disgust did not feature as dominantly as the SPAARS model might have expected, however it is not possible to ascertain whether this is due to the nature of the event and whether anxiety and anger might just be more pertinent to these two flood samples. However, findings at least suggest that other emotions are not adequately understood within trauma reactions and should be the focus of further research.

19.1.4 Question 2: Hypothesis b) Other emotions will be experienced after the flooding in addition to fear (and possibly to a greater degree in the aftermath)

In the same way, SPAARS would hypothesise that after the flood, emotions other than anxiety might also feature significantly. Previous flood literature also suggests that emotional experience might be greater in the aftermath of flooding (Green *et al.*, 1985; Parker *et al.*, 1983; Tapsell & Tunstall, 2001, 2008; Tunstall *et al.*, 2006) and it was hypothesised that other emotions might play a more significant role in the aftermath than during the event.

Again findings reflected that after the flood, all four negative basic emotions were experienced and were in fact slightly elevated compared to during the flood. However, only fear and anger featured dominantly, making it unclear whether sadness and disgust are less dominant following disasters or whether they were just less significant within these samples than they might be in others.

In addition, previous literature suggesting that the aftermath can be a more emotional time was tentatively supported by findings that negative emotions did not change significantly after the flood and were in fact slightly increased, suggesting that the ongoing emotional turmoil following flooding

can be as difficult as the flood itself. However, despite prolonged negative affect, ratings of happiness increased significantly once the event was over. Consequently, increased negative emotions were combined with increased positive experiences in the aftermath and therefore might reflect a more complex emotional picture than previous literature accounts for. In addition, although it is understandable why individuals would report feelings of anxiety, it is interesting but less clear as to why individuals experienced anger so dominantly both at the time and within the aftermath. Anecdotally, those affected by flooding spontaneously describe sadness far more than anger and it would therefore be valuable to ascertain the nature of the anger experienced, particularly in how it might relate to appraisals made at the time.

19.1.5 Question 3: Hypothesis a) Flood variables will not have a significant effect on impact or distress measures

The majority of previous literature documents potential differences in disaster variables and their impact on distress; including the effects of evacuation and financial loss (Bland *et al.*, 1996), severity of exposure (Jordan *et al.*, 2004; Neria *et al.*, 2006; Schlenger *et al.*, 2002) and degree of property destruction (Neria *et al.*, 2008; Norris *et al.*, 2004). However some authors highlight that findings are at best inconclusive (Norris *et al.*, 2004) and potentially contradictory (for example, in terms of distress related to previous experience of disasters) (Bland *et al.*, 1996; Norris & Murrell, 1988). It is therefore unclear how these variables affect distress and do not consider the value of meanings of events derived by individuals (Norris *et al.*, 2004; Olff & Gersons, 2005). However, the SPAARS model hypothesises that variables do not take account of individual's experience or appraisals of events and therefore should not be able to predict distress or impact measures. Consequently, it was hypothesised that findings would not support previous literature of the effects of variables and that no significant differences in distress would be found based upon these predictors.

Due to limited data, it was not possible to make statistical comparisons as to the impact of location during reinstatement and experience of traumatic events before the flood. However there were no significant differences in reactions or emotions based upon height of flood water, having stayed or left home during flooding, or whether they experienced insurance difficulties. Available findings were therefore contradictory to previous literature and went some way towards supporting the SPAARS-based hypothesis. Unfortunately, exploring a direct linear relationship between environmental factors such as water level and degree of distress is conceptually flawed. There is no way of knowing the level threshold above which water level might have an impact on distress, and although this study adopting such an approach in this study, it has highlighted that comparisons of this nature are often meaningless. Nevertheless, they have occurred widely within previous literature (Bland *et al.*, 1996; Neria *et al.*, 2008; Norris *et al.*, 2004). Consequently, the SPAARS' focus upon individual experience, appraisals and schematic discrepancies as a mediator of distress may be a more valuable conceptualisation for post-disaster samples, based upon variables other than those provided by the event itself.

19.1.6 Question 3: Hypothesis b) Dysfunctional emotion regulation strategies will have a significant effect upon impact and distress compared with flood variables

Despite flood variables not predicting distress, the SPAARS model would suggest that emotion regulation strategies should be related to differences in distress experienced. There is also some support for this contention based upon theoretical understandings of the maintenance of PTSD (Ehlers & Clark, 2000) as both models would suggest that blocking of trauma-based information should be related to greater distress. More specifically, in terms of the SPAARS model, Phillips & Power (2007) outline that emotions provide functional information for overcoming difficulties and therefore blocking or suppression of this information prevents difficulties from being adaptively overcome. Consequently, it was hypothesised that 'dysfunctional' strategies (those not making use

of emotional information) should be related to greater distress than functional ones (those which take emotional information into consideration). Unfortunately, due to limited available data, it was not possible to explore this relationship further within this study and further research into this aspect of the SPAARS conceptualisation would be benefitial.

19.1.7 Question 3: Hypothesis c) Distress should reduce over time (therefore be significantly higher in a sample flooded more recently).

Previous studies noted that posttraumatic sequelae tend to remit over time (Neria *et al.*, 2008; Rachman, 1980; 2001) and despite not utilising a longitudinal design, it was hypothesised that comparison of data from Carlisle and Morpeth flooded cohorts might reflect a reduction in scores in the Carlisle sample, related to remission over the time elapsed since the flood. Indeed, Morpeth participants did not differ significantly in terms of the emotional experience they reported during or after the flood, compared to the pseudo-longitudinal Carlisle sample, suggesting relatively similar flood experiences. However, Morpeth showed significantly higher intrusions, higher hyperarousal and significantly higher TSI mean scores compared to the Carlisle sample. Although this supported both the study hypothesis and previous literature into remission of distress over time, this only applies if the samples were comparable at the time of flooding. However, it is difficult to know the extent to which Carlisle and Morpeth samples were genuinely comparable in this regard. Further longitudinal study of specific flooded samples would be beneficial in this regard.

19.2 Question 4 – Qualitative Interviews

SPAARS provides an alternative approach to understanding emotional experience and impact symptoms following a traumatic event (emotion-non-specific component), however a significant aspect of the framework pertains to the concept that emotions elicited can be related to specific appraisals made of the event in terms of life goals. In addition, specific emotions are thought to be

related to certain profiles of symptoms; for example, disgust is related to appraisals of contamination and might be linked to symptoms such as washing behaviours (emotion-specific component). There is less quantifiable evidence of this, but anecdotal reports provide support for the concept and therefore participants were approached in an attempt to qualitatively document evidence relating to this component.

Unfortunately, participants contacted did not wish to be interviewed and it was therefore not possible to formally fulfil this aim of the study. Disappointingly, this prevents any real discussion of the SPAARS hypothesis that appraisals might predict emotions and subsequent symptoms. However, the lack of evidence to test does not invalidate further exploration of this issue and rather than disregarding the potential of the model, further research is recommended to compensate for the inability of this study to discuss this further.

20.0 Limitations of study

20.1 Sampling

A significant weakness of the study relates to the limited data making it impossible to test many of the initial hypotheses and making it difficult to draw specific conclusions about the potential value of the SPAARS framework in understanding post-disaster distress. This limitation is mainly associated with particular difficulties encountered in accessing flooded samples. Despite over 1000 homes being affected in Carlisle, individuals were not responsive to being approached individually to be asked to participate. Many stated that they did not wish to be involved without hearing what the study intended. Poor responses led to an online survey being necessary which was also limited in its response rate despite participants being entered into a prize draw as an incentive. In addition, a significant proportion of people flooded within Carlisle moved away from their homes following reinstatement and reflected a significant group, who may have been too distressed to remain within a

flood-risk zone, and who could be considered to have been more affected and more avoidant than those who remained within the flooded area. It was not possible to access these individuals as agencies who held their contact details would not allow access to them and the local press would not publish advertisements which might encourage these individuals to participate. Consequently, the Carlisle sample might be considered less representative of the broader flooded population who generally appear to not want to talk about the event. In addition, the time interval between the Carlisle flood and involvement in the study meant that the relationship between current distress and flood variables appeared to be less pertinent. Consequently, although the decision to focus on Morpeth data enabled a clearer comparison of effects of flood-variables, it is difficult to know how generalisable these findings are to other samples, or whether they are exclusively related to the event in Morpeth per se.

Ethical difficulties were also encountered in approaching flood-affected people after the event. Initially, ethical approval was given to select addresses within flooded areas and approach these homes to seek volunteers for the study. This was considered to be a rather intrusive approach, as participants would not have initiated contact themselves, however it is a method that is not without precedent in similar studies. For example, within the flooded area in Carlisle, Carroll *et al.* (2009) gained access to the local council's database of addresses and phone numbers of those affected and telephoned people to seek volunteers for their focus groups, which is considerably more intrusive, but appeared to be accepted by the local community. Nevertheless, to overcome concerns about intrusiveness of sampling methods in this study, it was intended that articles in the local press might serve to forewarn potential participants that they would be approached. However, when it was discovered that this was not possible in Carlisle, this sampling method was not undertaken further. Instead, leaflets were distributed to all households inviting them to participate remotely through a survey online to reduce the perceived intrusion of sampling. In addition, the local flood action group in Morpeth was instead relied upon to mediate distribution of questionnaires to its members.

Consequently, sampling methods endeavoured to respect the privacy of potential volunteers at all times and when it appeared that this might be contravened, alternative and less intrusive methods were adopted.

Compared to the Carlisle sample, Morpeth participants were more willing to participate and appeared to represent a less skewed and more cohesive community group who were willing to share their experiences and appreciated external interest in their difficulties. This may potentially have been due to the flood-affected population in Carlisle having already been asked to participate in previous studies (e.g. Carroll *et al*, 2009) and therefore did not wish to be involved in another study. However, the Carroll *et al* (2009) study was based upon a smaller number of participants than responded to this study and might therefore reflect a more specific objection or reluctance to being involved in flood-related research within Carlisle. In addition, as the majority of participants in Morpeth were members of the local Flood Action Group, their willingness to participate might be related to differences in the type of people who are inclined to join such action groups. However the Action Group comprised all members of the local community who were affected by the flooding and may alternatively represent differences between small rural communities compared to larger urban populations affected by such events. Despite this, a number of individuals described feeling too distressed to participate in the study; consequently although findings demonstrate significant difficulties within members of the community, they might in fact underestimate the degree of difficulties experienced. In both samples it is also likely that individuals who participated differed fundamentally from those who did not want to be involved and therefore reflect self-selected samples. The extent to which findings can be generalised to other flooded populations is therefore questionable. Nevertheless, a sample that reported greater distress enabled greater opportunity to access emotions and study their impact upon trauma symptoms and was potentially more useful for this study than accessing a more 'representative' sample.

20.2 Measures

Carlisle and Morpeth participants appeared to respond as expected to emotions before and after the flood and suggested that there were some differences in their emotional experiences between the two time points. However, it was unclear whether participants accurately differentiated between the two Basic Emotions Subscales used, particularly as many participants completed surveys remotely and without having this clarified for them by the researcher. The Basic Emotions Scale (Power, 2006) is also not a widely validated measure; however its design was the most appropriate for use in testing the hypotheses of this study and was therefore considered to have fulfilled this role better than other measures may have done. There were also difficulties in establishing the accuracy of disgust ratings on this measure as it was consistently rated lower than the other emotions. However, previous literature encountered the same difficulty in obtaining ratings of this emotion (Phillips & Power, 2007) and therefore the Basic Emotions Scale potentially fulfilled this purpose as well as other measures might.

The Regulation of Emotions Questionnaire (Phillips & Power, 2007) is also a relatively new measure and has less literature supporting its validity to date. Nevertheless, it too appeared to be appropriate for use within this sample, providing an accurate measure of regulation strategies which would appear to have captured regulation tendencies in a meaningful and acceptable format for participants involved.

In addition, demographic data gathered from participants was extremely useful in ascertaining flood-related differences which might have a bearing on emotional impact or distress. Participants were asked to state whether they had experienced any traumatic events prior to flooding and a variety of responses were provided. In terms of previous traumas, the literature states that experience of Criterion A events increases the risk of posttraumatic difficulties following subsequent traumatic events. However, participants were often uncertain as to what constituted a previous 'trauma' and

either listed distressing life events which would not fulfil the criterion or may have not reported events which would fulfil it. Although there are Life Events Checklists available which would serve to clarify these distinctions for participants, the Edinburgh Traumatic Stress Centre advised against using such a measure in a non-clinical population.

Finally, the Trauma Symptom Inventory (TSI) and Impact of Events Scale (IES-R) are well established and widely validated measures of trauma sequelae. However, participants did not like the items on the Trauma Symptom Inventory, particularly relating to sexual subscales. These subscales are not particularly relevant in establishing traumatic experiences within environmental disaster samples, as they were designed to assess traumatic sequelae in those affected by sexual traumas. Nevertheless, despite having no relevance to the current trauma focus, some participants refused to complete the survey based upon the distress they felt at these items. In addition, some participants who did complete the survey reported discomfort at completing some of the TSI items. As a consequence, participants potentially gave more socially desirable responses on this scale than they might have with other trauma measures. In addition, more participants may have been recruited if an alternative measure were used which was perceived as more acceptable to respondents.

20.3 Design

The most significant design limitation of this study was the inability to fulfil the final aim of the study, into the influence of appraisals in predicting emotions and specific symptoms based on qualitative interviews with selected individuals. At the time of the survey, all participants were asked to provide consent to be contacted to be interviewed about their experience. Very few participants opted out of this aspect of the study and only those who had provided consent were contacted later by email (the preferred method given by all volunteers). Individuals were thanked for participating in the first part of the survey and were assured that they had the right to withdraw

consent to be interviewed. They were asked to contact the researcher to arrange a convenient time for an interview but that if they did not respond to the invitation within four weeks, it would be assumed that they did not wish to participate. As these participants were selected due to higher scores for distress, they were not asked more than once whether they wished to participate. As such, every endeavour was made to be as accommodating and flexible in engaging with a more distressed portion of the sample, while respecting their right to opt out. However, only two of the participants made contact to arrange an interview, and only one of them attended. At this time, the participant only wished to be interviewed informally, thereby preventing detailed analysis of qualitative data. Unfortunately, being unable to fulfil this aim detracts greatly from the ability of the study to discuss the utility of the SPAARS model more thoroughly. However, the fact that SPAARS-based quantitative hypotheses are supported despite being contraindicated by previous literature goes some way to at least presenting this novel framework as something worth considering further.

The lack of a control sample was also a particular weakness of the study, but the control sample sought within Carlisle did not respond to invitations to participate. However, even with greater numbers, this population may not have reflected a true control group, as those actively moving into an area which has been recently flooded may differ fundamentally from those who would not for fear of it occurring again. This group may therefore have provided a skewed sample for comparison and participants gathered from the general population may have been more representative. However, as stated by Stout & Knight (1990), 'because natural disasters such as floods strike unexpectedly, finding comparable control groups for victims is a major obstacle for disaster research' (p.129).

In addition, although differences in trauma symptoms between Carlisle and Morpeth cohorts appeared to be related to time elapsed since the flood, there were differences between the flood events in each area which would influence reactions of those involved. For example, the flooding in Morpeth occurred faster and with greater force from the local river bursting its banks compared to

Carlisle where the majority of flooding occurred due to slow backup of pluvial water. In Carlisle, the flooding was considerably more extensive and affected the city's utilities such as water supplies and power, as well as affecting local emergency services compared to specific sites being flooded within Morpeth. Finally, the extent of the flooding in Carlisle could account for some differences in appraisals, as those affected were more forgiving of mistakes made by authorities due to their understanding that the entire city was affected by the disaster; whereas in Morpeth, victims felt let down and perceived negligence or deliberate actions by authorities when mistakes were made. In addition, there are many interrelated variables involved in flood events and an inability to control for them presents significant problems in research of this type. Flooded samples therefore present a heterogeneous mix of variables pertaining to an individual's emotional and psychological history, coping styles, interpersonal styles and how all of these interact with specific flood variables and appraisals, making it difficult to attribute distress according to causal factors.

Samples such as these are also subject to the possibility of recall biases. As Caldera *et al.* (2001) noted individuals suffering from mental distress after disasters may be more likely to report negative events and outcomes, such as greater destruction of property, therefore affecting generalisability of findings. In addition, it could be argued that there are flaws in a design that expects people to recall events which occurred up to four years earlier. Nevertheless, participants in Carlisle generated scores pertaining to the event which were equivalent to those in Morpeth who were flooded more recently, potentially supporting previous findings that recollections of an event as salient as a flood are broadly consistent over time (Tapsell *et al.*, 2003).

A potential weakness is also related to the fact that the researcher had been affected personally by the flooding in Carlisle and could be subject to greater bias than researchers who had not experienced this. However, the design of the study investigated questions in which bias would be less of an issue. Importantly, the personal flood experience of the researcher was valuable in establishing the research

questions and design undertaken in this study. Furthermore, participants in Morpeth reported greater interest in the study as a consequence of the researcher having been affected and therefore agreed to participate as they felt more 'understood' than if research were conducted by someone with no experience of flooding.

21.0 Implications for future research and clinical practice

21.1 Future Research

In their original paper, Dalgleish & Power (2004) presented examples of SPAARS formulations derived from case studies within the previous literature and from clinical practice, which was an intended endeavour of this flood study. As it was not possible to fulfil this objective, further studies of similar focus would be of clinical benefit, particularly as those affected anecdotally describe their experiences within a SPAARS framework without any prompting from a potentially biased researcher. In addition, replication of this study might benefit from using additional quantitative tools to record concepts such as appraisals, automatic emotions, emotions derived from appraisals (existential emotions) and symptoms driven by specific emotions as this could greatly increase our understanding of the framework and its applicability in samples such as these.

As Carlisle and Morpeth experienced differences in the characteristics of their flood events, it would be interesting to follow-up current Morpeth participants and use current Morpeth data as a baseline for measuring changes in their trauma symptoms over time. Also, being able to access groups who were not included within this study (such as those who moved away from the area) would be valuable in understanding the serious long-term difficulties experienced by proportions of the population who are potentially more affected by the event than those who remain in the area. In addition, it would have been interesting to have enquired into the use of mental health services and

prevalence of psychotropic prescriptions within study samples to ascertain the clinical service impact of flood events within local areas.

It would also be of interest to focus further on investigating the presence of "traumatic growth" and resilience in flooded populations. Although this study and its predecessors have been useful in showing the negative effects and traumatic potential of flooding, individuals within flooded samples also report positive impacts of their experience; for example, in helping them recognise different priorities in their lives and establishing new friendships (Hobfoll *et al.*, 2006; O'Leary *et al.*, 1998; Shakespeare-Finch *et al.*, 2003). These aspects are rarely investigated in psychological research where a tendency towards seeking out psychopathology within distressed populations remains the most common focus. Indeed, Government policies are beginning to notice findings such as those within this study which show that people experience greater distress when they are displaced from home and are consequently encouraging people to remain there where possible. However giving such advice based upon the face value of such research findings could potentially be more damaging for individuals. It is not always possible for people to return home, therefore understanding these findings in greater detail and understanding how to reduce distress in displaced families will enable provision of more appropriate and clinically valid assistance to populations experiencing flood events.

It is also apparent that flooding affects populations in a potentially complex manner and may have greater emotional underlay than other traumas, as the potential for complex appraisals during a flood is greater than it might be with more straightforward traumatic events. Consequently, more research into trauma-related appraisals and emotional experiences of flooded samples would be of scientific and clinical relevance. In doing so, ensuring quantitative measures are more socially acceptable may help in recruiting greater numbers of participants and gaining more accurate results. Also, previous Health Surveys conducted by the National Flood Forum in flooded communities across the United

Kingdom in recent years have received impressively high response rates. Further studies should seek to involve these agencies in future research and data collection as flooded populations perceive them as more approachable than other statutory or research agencies. In addition, it was described by many participants that once they returned home, they wanted to try to forget what had happened and therefore did not wish to participate further. Although understandable, this highlights the question of whether distress in individuals whose homes have been reinstated do in fact remit entirely and that only those with ongoing distress are more likely to volunteer for long-term studies, or whether people become increasingly avoidant of distress. As a researcher with personal experience of the longer term impact of flooding, and contact with individuals for whom reinstatement and flood-related difficulties continue many years after flooding, (for example, when poor workmanship means houses have to undergo further reconstruction to remove all flood-reinstated work and replace it a second time, but in the face of increased difficulties with insurance companies not accepting responsibility), the longer term impacts described in the literature, based upon individuals who do volunteer for studies does not always portray experiences as observed within the population as a whole. It is therefore suggested that future research endeavours more to define the complexities of these experiences, including positive and normative distress reactions in order to better classify the variety of difficulties that those affected might experience.

Furthermore, consideration of a SPAARS-type framework may not be pertinent merely to experiences such as flooding. Further research into this model within samples of complex traumas or distressing experiences, such as cancer patients or those enduring disfiguring surgery, or within victims of criminal activity, might foster better understandings of the variety of traumatic experiences and life events which many clinicians regularly encounter.

21.2 Implications

This study has endeavoured to focus on flood-related experiences in a manner which is unparalleled in much of the trauma literature and therefore poses a number of implications.

Firstly, previous literature focuses on pathologised reactions which detract from our understanding of normative distress following such events. This is further reflected in the current paucity of literature on resilience following disasters. In fact, sharing and helping among victims is often described as a positive experience that occurs as a result of disasters (Adams & Adams, 1984) but this is often forgotten in pathologically-focussed research.

Related to this, the bulk of previous literature falls into one of two opposing categories; either pathologising all levels of the distress experienced while failing to demonstrate thorough understandings of the classifications it uses, or normalising all distress to the point of minimising the potential clinical severity of some reactions, often based upon subjective assumptions of whether events are 'traumatic enough'. As such, it is extremely interesting within this study that clinically significant distress was found to a similar degree to that within the pathologically-focussed literature, despite hypothesising to the contrary. Nevertheless, finding clinically significant distress within a relatively large proportion of the sample still does not define it as pathological. Indeed the nature of this distress and its readiness to spontaneous remission is still not well understood and judgements upon clinical meaning should be avoided without further information. Therefore, flood distress should neither be entirely pathologised, nor entirely normalised, but should be considered as possible and considered on individual merit based upon complex individual experiences.

Findings of clinically-significant distress within this study also present implications for the service planning and provision around future flood events and concerns about the perception of post-

disaster distress which have been discussed herein are pertinent to the service-planning issue. Previous literature suggests that there is 'compelling evidence that health services need to anticipate and prepare for epidemics of PTSD and a lesser extent MDD (major depressive disorder), especially when associated with mass casualties and higher degree of community destruction' (Norris *et al.*, 2004; p.290). This might be a valuable preparatory assertion for services that endeavour to have resources available for intervening in acute distress; however, it reflects the literature's expectation that PTSD is an inevitable and common occurrence. Although risks and severe symptoms should always be considered as a matter of urgency, pathologising the occurrence of distress after disastrous life events can be detrimental to populations who are generally psychologically-intact. Anecdotally, these are often populations with limited prior experience of mental health services and for whom psychological difficulties might still pose a significant social stigma. Consequently, highlighting to such populations that distress following events is understandable and even expected can reduce fear and maintains psychological integrity. Indeed, a number of participants within these samples who would have individually met Criteria A for PTSD in terms of their flood experience described normal levels of distress which remitted naturally, and therefore, although clinically significant distress occurred with greater frequency than anticipated, it is important that studies reflect more carefully on the distress they describe. Distress can be clinically significant without being pathological and can still be conceptualised as a normative reaction to abnormal events. As such, providing messages which foster a degree of normalisation of post-disaster distress not only encourages better coping but also reduces perceived stigmatisation. Nevertheless, it is essential that distress is not minimised, as this too is detrimental to the psychological wellbeing of those affected.

Furthermore, use of professional support within these samples is not well understood and it is difficult to know the true service impact of events such as flooding. In Carlisle and Morpeth, local mental health services were prepared to act quickly upon referral of flood-affected individuals; however, the levels of uptake of services is not known, and anecdotally many people affected report

that they did not approach services for support. Importantly, previous studies into farmers affected by Foot & Mouth disease have suggested that despite significant distress, few of those affected approached mental health services or accepted input offered to them, preferring instead to utilise their own mechanisms of emotional support at these times (Peck, 2005). Consequently, statutory agencies often don't experience the opportunity to learn about their shortcomings in providing services to this population. It is, however, possible that mental health services might not have a role to play in populations who appear unwilling to approach them for assistance, but it is difficult to know whether services are just not needed or are feared within these disaster-affected populations, prohibiting affected individuals from seeking consultation. As such, services should not overlook the importance of being available and focussing support in a format that is acceptable to the local community and complementary to their current methods of service use.

Of interest when conducting this study were observations that knowledge of flood-related distress was varied across the range of organisations who engaged with those affected by flooding, especially when this knowledge is so pertinent to support that is provided. In meeting informally with participants and community groups, comparatively few people had approached statutory services to disclose the kind of difficulties or distress found within this study sample. Affected individuals often gravitated to voluntary organisations and local community groups who provided a valuable supportive service for flooded communities. However, they generally possessed little expertise in managing flood-related distress other than based upon their personal experiences. Despite the inherent value of this support, untrained volunteers with personal experience of flooding have the potential to misunderstand individual differences in responses to the same event, possibly expecting everyone to respond as they did, which could be detrimental to those accessing support. Of those who did approach their GPs about difficulties such as poor sleep or appetite, many were given courses of antidepressants with no particular flood-related focus to their treatment. Comparatively few went on to make use of specialist mental health services and those who did found similarly

polarised professional perceptions about the impact of flood-related trauma: either perceiving it as 'less serious' and underestimating the potential for flooding to generate posttraumatic distress; or pathologising comparatively 'normal' responses to flood trauma. Consequently, findings of this study might have some relevance in helping mental health specialists and primary care to understand that flooding can be a genuinely traumatic event with the potential to be more complex in terms of experiencing loss, anger, fear and disgust than is currently perceived. In addition, clinical opinions which minimise the potential for flooding to fulfil Criteria A of the DSM-IV classification of PTSD should be careful not to make assumptions based upon the objective safety of hindsight; indeed the actual threat to life and physical integrity posed by the event may have been more real or more genuinely perceived than most clinicians realise. Furthermore, although flooding can appear as a 'less dangerous event', it is one in which people can spend considerable periods of time without the security of their homes and in conflict with agencies over ownership of their property. As such, displacement and distress of flooded families might be more appropriately understood in comparison with some refugee communities, who would be recognised immediately as more 'traumatised' and given appropriate consideration than those affected by flooding.

In undertaking this study it was clear that having been personally affected by flooding gave the researcher greater access to the affected population and was therefore subsequently approached by the Morpeth community to provide advice and assistance about what to expect in the flood aftermath as someone who had already experienced this. Sadly, local professionals could have been better placed to provide this; but the community was more amenable to asking for assistance from those with personal experience of being flooded, albeit that they were from other localities. Therefore, flooded samples, despite being easily identified are not easily accessed, and statutory agencies would be advised to find different methods of providing assistance to this population; for example, by providing teaching or advice to local groups rather than expecting to see individuals for one-to-one interventions. Government agencies would also be advised to consider how to access these affected

populations in a manner which they feel comfortable with, as they did not respond amenably to advice from agencies that had no personal experience of these difficulties.

Finally, wider implications pertain to the potential relevance of the SPAARS model (Dalgleish & Power, 2004) in formulating distress of this sort. As outlined, flood trauma is a complex experience often 'judged' in terms of subjective clinical attributions and previous literature focuses on differentiating distress based upon objective flood variables but without consideration of individual experience or meaning. Previous literature also either pathologises or minimises flood-related distress and where posttraumatic stress symptoms are noted, they are understood solely in terms of fear experienced during the event, without accounting for the complexity or variety of reactions observed in flooded populations. The tenet of this study was therefore to move away from these current assumptions of disaster experience and encourage exploration of the complexities of reactions; but if clinicians aim to do this in their work, how can they know they are formulating disaster distress in a clinically valuable and individually meaningful way?

Although not entirely addressed within the findings of this study, there is some evidence that SPAARS model might hold particular value in answering this concern. Firstly, in terms of the wider traumatic literature, the consideration of discrepancies as being predictive of posttraumatic sequelae is extremely valuable in recognising that we cannot always predict who might suffer most in the aftermath of trauma, and that individuals with previous trauma experiences might not always be those who are at the greatest risk of posttraumatic distress. Secondly, recognising that differential emotions can predict posttraumatic sequelae in both Criteria A and non-Criteria A events is a novel perspective, and has significant implications for understanding and for effectively treating the variety of posttraumatic reactions noted. For example, PTSD is currently treated with interventions designed for the remission of anxiety, but if anxiety is not the predominant underlying emotion then current interventions may at best be ineffective and at worst increase individuals' distress further.

Consequently, consideration should be given to alternative underlying emotions when formulating individuals' difficulties and alternative treatments for distress based on remission of anger, sadness or disgust should be considered further as need arises. Indeed such a perspective has already been applied within the specialist tertiary trauma service provided at the Edinburgh Traumatic Stress Centre, based upon the strength of the theory presented, even in the absence of supportive literature. Thirdly, the Dalgleish & Power (2004) model is elegant in structuring posttraumatic experiences within a framework based upon normative emotion and cognitive function; reminding us that distress symptoms can occur on a spectrum of severity, rather than solely pathologising the symptoms that individuals might experience. With this in mind, although the majority of distress will improve over time, providing education for affected groups about what is 'normal' to expect following traumatic difficulties could prevent individuals from being concerned about 'unusual' symptoms and from engaging in avoidant strategies which could ultimately cause them greater and ongoing distress.

21.3 Conclusion

Findings that SPAARS-based hypotheses were supported to some degree by quantitative data are considered with great interest. Although the hypotheses and subsequent findings are sometimes contradictory to previous literature and may therefore be contentious or challenging in their nature, it is easy to condemn or invalidate them as flawed and misguided without considering the wider value they present. These findings are not presented to condemn previous literature nor claim conceptual supremacy but merely to offer a challenge to the conclusions drawn by previous literature. The fact that hypotheses have been fulfilled which are contradictory to previous understandings reflect that greater consideration of individually-derived meanings should be practised; not only individual meanings attributed to events such as flooding, but also to the meanings construed within the trauma literature of the findings they present. A degree of meaning is always lost in the quantification of

any construct and as further qualitative data were not available, SPAARS conclusions within this study are discussed with caution. However, the value of the model does not lie in quantitative support for its constructs, but in the fact that the model considers individual appraisals and experience above all else. It also considers the potentially normal nature of distress and thereby provides a unique model by which to formulate post-disaster distress. Indeed, its adoption within the Edinburgh Traumatic Stress Centre as a valid clinical formulation highlights its utility for those experiencing intense distress following a variety of events.

At the very least, SPAARS provided a clinician who had personal experience of flooding with a realistic clinical framework to conceptualise the variety of post-flood reactions when other frameworks either did not appear to offer the same degree of sophistication, or resorted to pathologising or minimising posttraumatic formulations. It is therefore recommended that further consideration within clinical practice should be given to the constructs of this model and meanings of events to those affected; and that clinical assumptions should be applied with caution to avoid misinterpretations about the realistic dangers presented by flood events.

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Appendices

DClinPsychol Ethics Meeting (Panel 2)

10th November 2008

Present	**Apologies**
Emily Newman (Chair)	Dave Peck
David Gillanders	Lindsey Murray (comments submitted)
Ethel Quayle	Karen McKenzie (comments submitted)

Trainee CEJN

The panel were positve about the proposal and felt that there was a good theoretical basis to it and that it had ecological validity. There was, however, a need for further clarification in some areas.

Ethical:

- A picture of a flood scene has been placed on the information sheet. Concern was expressed that this may evoke memories that would be distressing to some participants.
- There is confusion about anonymity and confidentiality which needs clarification. It is likely that she can ensure the former but not the latter.
- The word chat is used in the information sheet which does not accurately reflect what might be an interview of the participant. This is too informal and needs changing.
- Similarly the use of the words 'drop-out' may have an overly negative tone and should be replaced by, 'any participants who wish to withdraw from the study'.
- The wording 'training to be a trainer' needs to be changed as does the name of the academic programme, which is incorrect.
- Giving folk "information about where to seek local help for more persistent difficulties" is mentioned but this may create ethical problems. For example, what about those who have been traumatised but never referred to services?
- Will the proposal be also submitted to the NHS Ethics Committee?

Methodological:

- It is unclear what the hypotheses of the study are beyond the general description of the aims.
- There is no clear operational definition of what will be included as flooding. This potentially covers a wide range of experiences and may be associated with an array of emotional reactions.
- Is it likely that emotional reactions to flooding are likely to be mediated by the causal attributions that people make? Will these differ depending on the nature of the flood/level of damage?
- An assumption is made that flooding is associated with PTSD, but it is not clear what the evidence base is for this. Would the study have greater clarity if it attempted to establish if this is the case as a primary goal of the study, which then might include an examination of the emotional reactions to flooding?
- Are there any possible problems with respondents in the cohort from 2005 being able to recall their emotional reactions at the time of the flood? Is this going to make comparisons with the 2008 cohort problematic?
- Are the new residents going to be asked to participate as a control? This is unclear. Would it make more sense for those who lived in the area but were not flooded to act as a control?
- The geographical areas listed at the beginning of the proposal are not the same as those from which the sample will be drawn. This needs to be amended.

- Is the power analysis based on previous studies? This needs further clarification.
- There is confusion over which emotional reactions are being measured. On the information sheet reference is made to 'just before the flood' whereas in the proposal it is described as 'during the flood'. This needs to be amended.
- The information sheet provides a list of post traumatic symptoms. Is there a possibility that this will affect respondents' participation and recall?

The panel does not need to see the proposal once these issues are addressed to the satisfaction of the supervisor.

Re: Changes following ethics

Mick Power [mjpower@staffmail.ed.ac.uk]

Sent: 10 December 2008 15:11

To: NHS Dumfries and Galloway ; Trainee CEJN

Hello,

In response to your email, the proposed changes look fine and you do not need to re-submit them to the Clinical Psychology Ethics Committee or any other Ethics Committee.

I hope these comments cover what you have asked, but get back to me with any further questions. And, if you don't have any, then why not get started!

All best wishes,
Mick.

RE: Were you Flooded

Haining Shona \(5D8\) North Tyneside PCT [Shona.Haining@northtyneside-pct.nhs.uk]

Sent: 05 February 2009 08:26

To: Trainee CEJN (NHS Dumfries and Galloway)

Thanks for your explanation – your study does not require NHS approval as I see that it is not involving participant from a service-related sample. Nevertheless, I always advise researchers to contact R&D depts to get their views and assurance it does not need approvals if that is the case. We will let this continue as I know you will be following ethical procedures and wish you luck with the study.

Best regards, Shona

Shona A Haining BSc PhD
Research & Development Manager
NHS North of Tyne

Bevan House, 1 Esh Plaza, Sir Bobby Robson Way, Great Park
NEWCASTLE
NE13 9BA
Tel no. 0191 217 2748

RE: Were you Flooded

Moores Alex: North Cumbria Mental Health and LD Trust [Alex.Moores@ncumbria.nhs.uk]

Sent: 10 February 2009 14:36

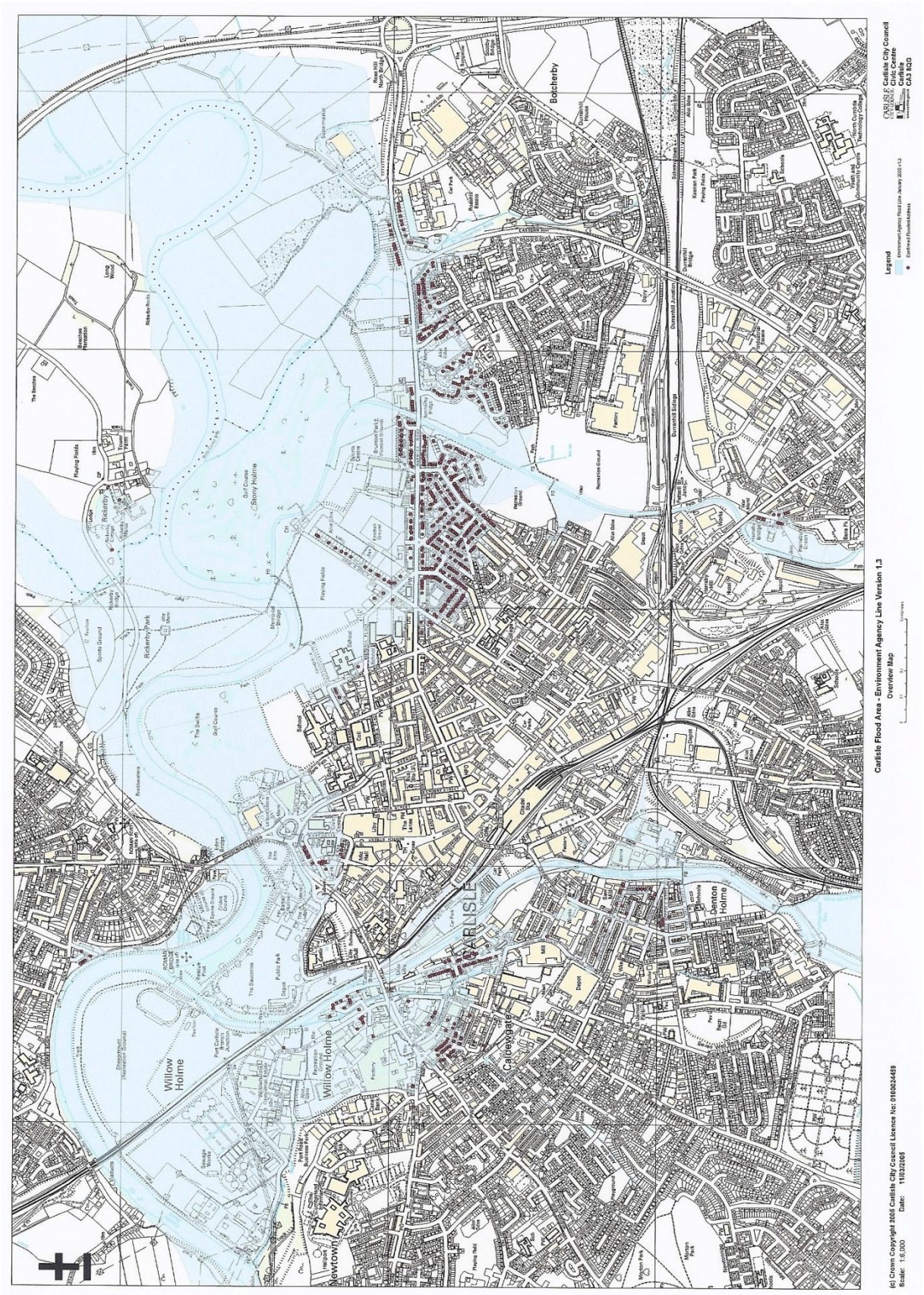
To: Trainee CEJN (NHS Dumfries and Galloway)

Thank you for your email about your study. However as it does not involve a clinical sample, it does not require us to give approval for it. Thank you for the courtesy of contacting us. Please do not hesitate to contact us again if we can be of assistance.

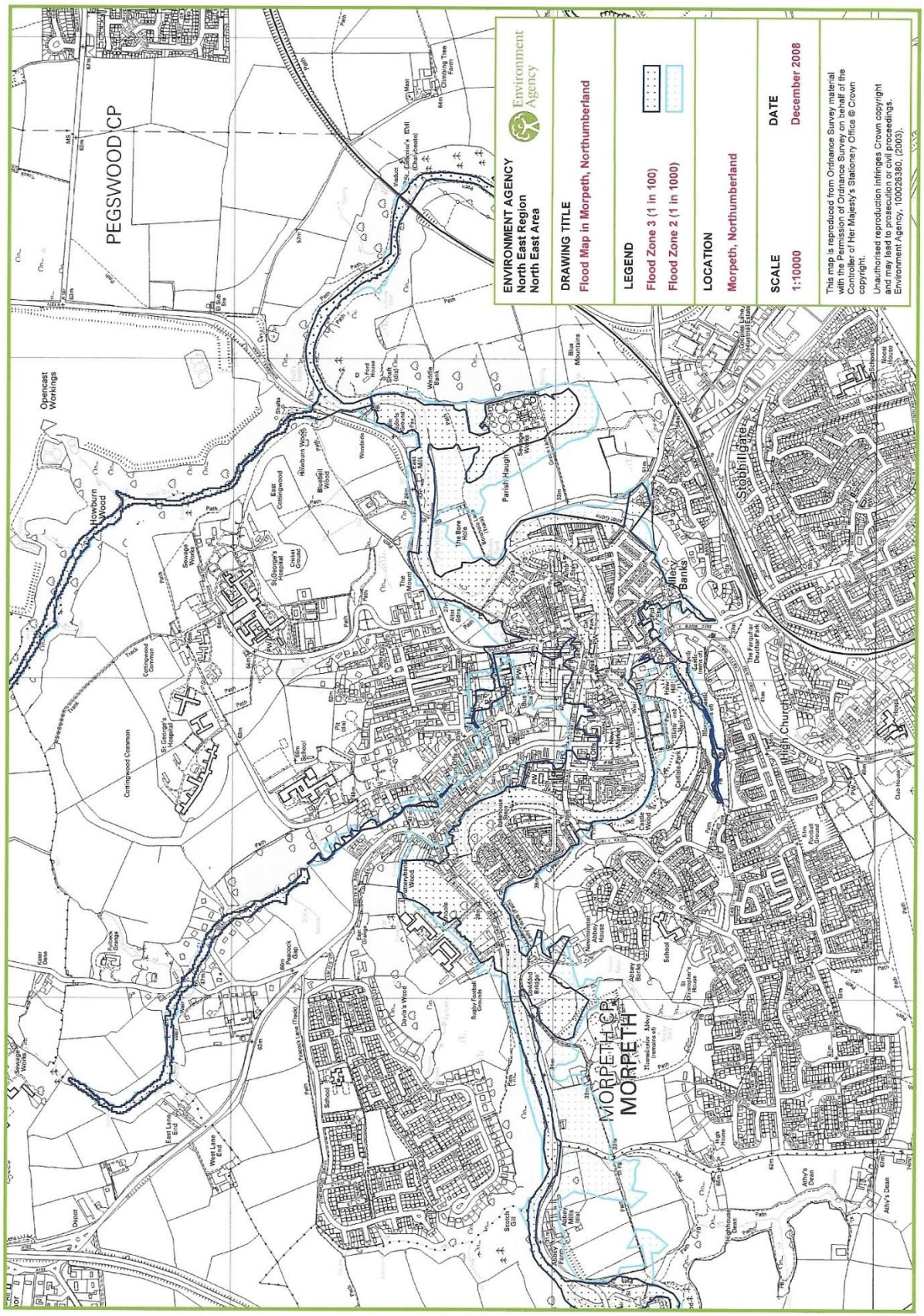
Yours sincerely

Alex Moores
Research & Development North Cumbria NHS
Carleton Clinic, Cumwhinton Drive, CARLISLE
CA1 3SZ Tel no. 01228 603761. Web: www.ncumbria.nhs.uk/mhld

Appendix 3
Flood Map – CARLISLE



Appendix 3
Flood Map –MORPETH



Appendix 4

Patient Information Leaflet

Research Study

Post traumatic reactions and emotions experienced by victims of flooding

Information Leaflet for Potential Participants

Research Study

Participants are being recruited to take part in a study about the emotional and psychological reactions of people who have experienced flooding. The research is being conducted as part of a study from the University of Edinburgh. As part of the study, we wish to hear from people who were affected directly by flooding, but also by those living within the area who were not flooded.

Before you decide if you wish to take part, it is important that you understand why the research is

2. What is the purpose of the research?

Flooding is becoming increasingly common and it would be helpful for professional agencies to understand what people experience when they are affected by flooding so that we can help people who are affected as well as people who might be flooded in future.

Also, people can experience different types of traumas and this study will help us to understand better how people feel after they have experienced distressing events so that we can offer more appropriate help to them.

3. What will I have to do to take part?

If you agree to take part, you will be asked to complete some questionnaires. These questionnaires will ask you to tell us about your feelings during the flood and once the water had gone. Then they will ask you about specific symptoms which psychologists understand can happen after people have experienced traumatic things and about the ways in which you usually cope with difficulties that occur generally.

When we ask you to complete these questionnaires, we will ask you if you would feel happy to let us have your name and contact details. You do not have to give this information if you don't want to. If you do, we might contact you at a later date to ask you some more questions about your experience during the flood.

If you give us your information and then we contact you but you have changed your mind and

4. What are the possible benefits of taking part?

You would be helping us to get a better understanding of how flooding affects people and how it makes them feel. You would also be helping us to understand how people who experience other traumatic events might feel which might help us to help them.

We hope the results will be used to provide services with a better understanding about how to help people who have been affected by flooding.

5. What are the possible disadvantages of taking part?

We understand that having been affected by flooding you might not want to talk about it, or might get upset when you start thinking about it. We will be as considerate of this as possible and you do not have to take part in the study if you are concerned about this.

If you do wish to take part but become upset, you might want to withdraw from the study and you can do this at any time. However, if you feel particularly distressed as a result of your experience during the flood, we would recommend that you speak to your GP for advice.

6. Who will be able to see my answers?

Only the researchers will see the questionnaires you filled in and we won't talk to other people about what you have answered. If you are worried about this, you can answer the questionnaires anonymously if you prefer.

A small number of individuals might be approached if they have provided their contact details but once we have selected these people and spoken to them, all details will be disposed of securely.

What will happen to all the results of the research study?

The results will be included in a Doctoral thesis by the researcher. The summary results will also be presented to be published and will be presented at conferences so that other professionals and services can learn from the findings.

However the results will be anonymous and no one will be able to identify who took part in the

Further information:

The researcher is a Trainee Clinical Psychologist with the University of Edinburgh Clinical Psychology Doctorate course and was herself flooded in Carlisle in 2005, leading to a professional interest in this as a result of her experience.

The research has been reviewed by the Ethics Committee at the University of Edinburgh and will be reviewed throughout by supervisors within the Clinical & Health Psychology Department at the

Contact Information:

Please feel free to contact the researcher, Catherine Nesbitt:

On: 07739 438427

Or: 01387 244495

Or by email: catherine.nesbitt@nhs.net

Also, please feel free to speak to your local area representative at the National Flood Forum:

(See www.floodforum.org.uk for details) or call 01299 403101.

Participant Consent Form:

Please sign if you agree with the following points:

I have read and understood the information about the study and could ask questions that I needed to.

Appendix 5
Carlisle Recruitment Leaflet

Do you live within the area that was flooded in 2005?

Were you flooded yourself or have you moved into the area since?

We need your help

A researcher from the University of Edinburgh is conducting a study locally into the effects of being flooded and of living in an area which was affected by the flooding in 2005. Whether you lived here at the time or have moved here since, we are looking for volunteers to help us with this project.

The project has been approved by the University of Edinburgh and addresses within the flooded area are being chosen at random. The occupiers of these addresses are being approached to give additional information about the study and to ask if they might take a few minutes to complete some questionnaires.

Your address has been selected randomly and the researcher will be returning to ask if you would volunteer to complete approximately six questionnaires. They may take about 20 minutes to complete. You can complete them anonymously if you prefer and either return them by post or we can go through them with you in person if you wish.

If you do not wish to be approached by the researcher, please contact them (details below) to ask that your address be removed from the selected list.

As a token of appreciation for taking part, all volunteers will be entered into a draw to win a £50 token from a shop of their choice.

If you are not sure whether you want to take part but would like further information, please contact the researcher who would be happy to answer any questions you have about the study. We would really appreciate your help and look forward to hearing from you.

Please contact the researcher, Catherine Nesbitt (Trainee Clinical Psychologist)

On: **01387 244495**

Or by emailing: **catherine.nesbitt@nhs.net**

Basic Emotions

The Basic Emotions Scale – Part 1

Short-Version

When confronted with a traumatic experience, people react emotionally to the event. Sometimes some of these emotions prevail over others and linger. This scale is designed to explore how your traumatic experience affected how you have felt.

Think back to your experience during the flood, and how you felt while water was in your house. With this in mind, look at each emotion and please circle **one** number between 1 and 7 to indicate how often you've felt that emotion since your traumatic experience.

DURING the flood, I felt this emotion:

	Never						Very often
Anger	1	2	3	4	5	6	7
Despair	1	2	3	4	5	6	7
Shame	1	2	3	4	5	6	7
Anxiety	1	2	3	4	5	6	7
Happiness	1	2	3	4	5	6	7
Frustration	1	2	3	4	5	6	7
Misery	1	2	3	4	5	6	7
Guilt	1	2	3	4	5	6	7
Nervousness	1	2	3	4	5	6	7
Joy	1	2	3	4	5	6	7
Irritation	1	2	3	4	5	6	7
Gloominess	1	2	3	4	5	6	7
Humiliated	1	2	3	4	5	6	7
Tense	1	2	3	4	5	6	7
Loving	1	2	3	4	5	6	7
Aggression	1	2	3	4	5	6	7
Mournful	1	2	3	4	5	6	7
Blameworthy	1	2	3	4	5	6	7
Worried	1	2	3	4	5	6	7
Cheerful	1	2	3	4	5	6	7
Disgust (i.e. repulsion)	1	2	3	4	5	6	7

Thank you – please complete the next questionnaire.

Appendix 7
Basic Emotions Scale 2 – After the Flood

The Basic Emotions Scale – Part 2

Short-Version

When confronted with a traumatic experience, people react emotionally to the event. Sometimes some of these emotions prevail over others and linger. This scale is designed to explore how your traumatic experience affected how you have felt.

Think about how you felt after the flood, during the clearing up and reinstatement process. With this in mind, look at each emotion and please circle **one** number between 1 and 7 to indicate how often you've felt that emotion since your traumatic experience.

AFTER the flood, I felt this emotion:

	Never						Very often
Anger	1	2	3	4	5	6	7
Despair	1	2	3	4	5	6	7
Shame	1	2	3	4	5	6	7
Anxiety	1	2	3	4	5	6	7
Happiness	1	2	3	4	5	6	7
Frustration	1	2	3	4	5	6	7
Misery	1	2	3	4	5	6	7
Guilt	1	2	3	4	5	6	7
Nervousness	1	2	3	4	5	6	7
Joy	1	2	3	4	5	6	7
Irritation	1	2	3	4	5	6	7
Gloominess	1	2	3	4	5	6	7
Humiliated	1	2	3	4	5	6	7
Tense	1	2	3	4	5	6	7
Loving	1	2	3	4	5	6	7
Aggression	1	2	3	4	5	6	7
Mournful	1	2	3	4	5	6	7
Blameworthy	1	2	3	4	5	6	7
Worried	1	2	3	4	5	6	7
Cheerful	1	2	3	4	5	6	7
Disgust (i.e. repulsion)	1	2	3	4	5	6	7

Thank you – please complete the next questionnaire.

IMPACT OF EVENT SCALE-REVISED

Instructions: The following is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you ***during the past 7 days*** with respect to the flood. How much were you distressed or bothered by these difficulties?

		Not at all	A little bit	Moder ately	Quite a bit	Ex- tremely
1	Any reminder brought back feelings about it.	0	1	2	3	4
2	I had trouble staying asleep.	0	1	2	3	4
3	Other things kept making me think about it.	0	1	2	3	4
4	I felt irritable and angry.	0	1	2	3	4
5	I avoided letting myself get upset when I thought about it or was reminded of it.	0	1	2	3	4
6	I thought about it when I didn't mean to.	0	1	2	3	4
7	I felt as if it hadn't happened or wasn't real.	0	1	2	3	4
8	I stayed away from reminders about it.	0	1	2	3	4
9	Pictures about it popped into my mind.	0	1	2	3	4
10	I was jumpy and easily startled.	0	1	2	3	4
11	I tried not to think about it.	0	1	2	3	4
12	I was aware that I still had a lot of feelings about it, but I didn't deal with them.	0	1	2	3	4
13	My feelings about it were kind of numb.	0	1	2	3	4
14	I found myself acting or feeling like I was back at that time.	0	1	2	3	4
15	I had trouble falling asleep.	0	1	2	3	4
16	I had waves of strong feelings about it.	0	1	2	3	4
17	I tried to remove it from my memory.	0	1	2	3	4
18	I had trouble concentrating.	0	1	2	3	4
19	Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart.	0	1	2	3	4
20	I had dreams about it.	0	1	2	3	4
21	I felt watchful and on guard.	0	1	2	3	4
22	I tried not to talk about it.	0	1	2	3	4

Thank you – please complete the next questionnaire.

Appendix 9
Trauma Symptom Inventory, TSI

Trauma Symptom Inventory

Adapted Format

This questionnaire contains 100 items describing experiences that may or may not have happened to you. Please do not feel alarmed by the content of any of the items; they are all symptoms that have been reported by people who have experienced traumatic events.

For each item, please circle the **one answer** that best indicates how often each of the following experiences have happened to you **in the last 6 months**.

Please answer each item as honestly as you can. Be sure to answer every item. You can take as much time as you need to finish it.

In the last 6 months, how often have you experienced:

	Never			Often
1. Nightmares or bad dreams	0	1	2	3
2. Trying to forget about a bad time in your life	0	1	2	3
3. Irritability	0	1	2	3
4. Stopping yourself from thinking about the past	0	1	2	3
5. Getting angry about something that wasn't very important	0	1	2	3
6. Feeling empty inside	0	1	2	3
7. Sadness	0	1	2	3
8. Flashbacks (sudden memories or images of upsetting things)	0	1	2	3
9. Not being satisfied with your sex life	0	1	2	3
10. Feeling like you were outside of your body	0	1	2	3
11. Lower back pain	0	1	2	3
12. Sudden disturbing memories when you were not expecting them	0	1	2	3
13. Wanting to cry	0	1	2	3
14. Not feeling happy	0	1	2	3
15. Becoming angry for little or no reason	0	1	2	3
16. Feeling like you don't know who you really are	0	1	2	3
17. Feeling depressed	0	1	2	3
18. Having sex with someone you hardly knew	0	1	2	3
19. Thoughts or fantasies about hurting someone	0	1	2	3
20. Your mind going blank	0	1	2	3
21. Fainting	0	1	2	3
22. Periods of trembling or shaking	0	1	2	3
23. Pushing painful memories out of your mind	0	1	2	3
24. Not understanding why you did something	0	1	2	3
25. Threatening or attempting suicide	0	1	2	3
26. Feeling like you were watching yourself from far away	0	1	2	3
27. Feeling tense or "on edge"	0	1	2	3
28. Getting into trouble because of sex	0	1	2	3
29. Not feeling like your real self	0	1	2	3
30. Wishing you were dead	0	1	2	3
31. Worrying about things	0	1	2	3
32. Not being sure of what you want in life	0	1	2	3
33. Bad thoughts or feelings during sex	0	1	2	3
	Never			**Often**
34. Being easily annoyed by other people	0	1	2	3

35. Starting arguments or picking fights to get your anger out	0	1	2	3
36. Having sex or being sexual to keep from feeling lonely or sad	0	1	2	3
37. Getting angry when you didn't want to	0	1	2	3
38. Not being able to feel your emotions	0	1	2	3
39. Confusion about your sexual feelings	0	1	2	3
40. Using drugs other than Marijuana	0	1	2	3
41. Feeling jumpy	0	1	2	3
42. Absent-mindedness	0	1	2	3
43. Feeling paralysed for minutes at a time	0	1	2	3
44. Needing other people to tell you what to do	0	1	2	3
45. Yelling or telling people off when you felt you shouldn't have	0	1	2	3
46. Flirting or "coming on" to someone to get attention	0	1	2	3
47. Sexual thoughts or feelings when you thought you shouldn't have had them	0	1	2	3
48. Intentionally hurting yourself (for example by scratching, cutting or burning) even though you weren't trying to commit suicide	0	1	2	3
49. Aches and pains	0	1	2	3
50. Sexual fantasies about being dominated or overpowered	0	1	2	3
51. High anxiety	0	1	2	3
52. Problems in your sexual relations with another person	0	1	2	3
53. Wishing you had more money	0	1	2	3
54. Nervousness	0	1	2	3
55. Getting confused about what you thought or believed	0	1	2	3
56. Feeling tired	0	1	2	3
57. Feeling mad or angry inside	0	1	2	3
58. Getting into trouble because of your drinking	0	1	2	3
59. Staying away from certain people or places because they reminded you of something	0	1	2	3
60. One side of your body going numb	0	1	2	3
61. Wishing you could stop thinking about sex	0	1	2	3
62. Suddenly remembering something upsetting from your past	0	1	2	3
63. Wanting to hit something or someone	0	1	2	3
64. Feeling hopeless	0	1	2	3
65. Hearing someone talk to you who wasn't really there	0	1	2	3
66. Suddenly being reminded of something bad	0	1	2	3
67. Trying to block out certain memories	0	1	2	3
68. Sexual problems	0	1	2	3
69. Using sex to feel powerful or important	0	1	2	3
70. Violent dreams	0	1	2	3
71. Acting "sexy" even though you didn't really want sex	0	1	2	3
72. Just for a moment, seeing or hearing something upsetting that happened earlier in your life	0	1	2	3
73. Using sex to get love or attention	0	1	2	3
74. Frightening or upsetting thoughts popping into your mind	0	1	2	3
75. Getting your own feelings mixed up with someone else's	0	1	2	3
76. Wanting to have sex with someone who you knew was bad for you	0	1	2	3
77. Feeling ashamed about your sexual feelings or behaviour	0	1	2	3
78. Trying to keep from being alone	0	1	2	3
79. Losing your sense of taste	0	1	2	3
80. Your feelings or thought changing when you were with other people	0	1	2	3
81. Having sex that had to be kept secret from other people	0	1	2	3
	Never			**Often**
82. Worrying that someone is trying to steal your ideas	0	1	2	3

83. Not letting yourself feel bad about the past	0	1	2	3
84. Feeling like things weren't real	0	1	2	3
85. Feeling like you were in a dream	0	1	2	3
86. Not eating or sleeping for 2 or more days	0	1	2	3
87. Trying not to have feelings about something that once hurt you	0	1	2	3
88. Daydreaming	0	1	2	3
89. Trying not to think or talk about things in your life that were painful	0	1	2	3
90. Feeling like life wasn't worth living	0	1	2	3
91. Being startled or frightened by sudden noises	0	1	2	3
92. Seeing people from the spirit world	0	1	2	3
93. Trouble controlling your temper	0	1	2	3
94. Being easily influenced by others	0	1	2	3
95. Wishing you didn't have any sexual feelings	0	1	2	3
96. Wanting to set fire to a public building	0	1	2	3
97. Feeling afraid that you might die or be injured	0	1	2	3
98. Feeling so depressed that you avoided people	0	1	2	3
99. Thinking that someone was reading your mind	0	1	2	3
100. Feeling worthless	0	1	2	3

Thank you for completing these questionnaires. We really appreciate your assistance.

Please remember to complete the attached form if you wish to be entered into the prize draw.

Regulation of Emotion Questionnaire 2

We all experience lots of different feelings or emotions. For example, different things in our lives make us feel happy, sad, angry and so on…

The following questions ask you to think about **how often** you do certain things **in response to your emotions**. You do not have to think about specific emotions but just how often you **generally** do the things listed below.

Please tick the box corresponding to the answer that fits best. We all respond to our emotions in different ways so there are no right or wrong answers.

In GENERAL **how do you respond to your emotions?**	Never	Seldom	Often	Very Often	Always
1. I talk to someone about how I feel	○	○	○	○	○
2. I take my feelings out on others verbally *(e.g. shouting, arguing)*	○	○	○	○	○
3. I seek physical contact from friends or family *(e.g. a hug, hold hands)*	○	○	○	○	○
4. I review (rethink) my thoughts or beliefs	○	○	○	○	○
5. I harm or punish myself in some way	○	○	○	○	○
6. I do something energetic *(e.g. play sport, go for a walk)*	○	○	○	○	○
7. I dwell on my thoughts and feelings *(e.g. It goes round and round in my head and I can't stop it)*	○	○	○	○	○
8. I ask others for advice	○	○	○	○	○

In GENERAL **how do you respond to your emotions?**	Never	Seldom	Often	Very Often	Always

9. I review (rethink) my goals or plans	○	○	○	○	○
10. I take my feelings out on others physically *(e.g. fighting, lashing out)*	○	○	○	○	○
11. I put the situation into perspective	○	○	○	○	○
12. I concentrate on a pleasant activity	○	○	○	○	○
13. I try to make others feel bad *(e.g. being rude, ignoring them)*	○	○	○	○	○
14. I think about people better off and make myself feel worse	○	○	○	○	○
15. I keep the feeling locked up inside	○	○	○	○	○
16. I plan what I could do better next time	○	○	○	○	○
17. I bully other people *(e.g. saying nasty things to them, hitting them)*	○	○	○	○	○
18. I take my feelings out on objects around me *(e.g. deliberately causing damage to my house, school or outdoor things)*	○	○	○	○	○
19. Things feel unreal *(e.g. I feel strange, things around me feel strange, I daydream)*	○	○	○	○	○
20. I telephone friends or family	○	○	○	○	○
21. I go out and do something nice *(e.g. cinema, shopping, go for a meal, meet people)*	○	○	○	○	○

Thank you – please complete the next questionnaire.

Post-Traumatic Reactions to Flooding

Thank you for agreeing to take part in this research.

You will now be asked to complete a number of questionnaires. Each one gives its own instructions about how to complete it but please do ask for assistance if you are not sure what to do.

Firstly, please complete a few questions about yourself:

Age:

Sex: **Male / Female** *(please circle)*

1) Please give an indication of the severity of the flood impact within your property

E.g. *Height of the water*
.....

Indication of the extent of possessions lost
.....

Or any other means by which you would describe this

.....
.....

2) Did you leave your home during the flood? *(please circle)* **Yes / No**

E.g. *Evacuated during flood*
Decided to leave your home during flood
Stayed at home throughout *(please delete as applicable)*

Please give any additional details which you feel are relevant:

.....
.....

3) Did you leave your home after the flood (after water had receded)? *(please circle)* **Yes / No**

E.g. *Lived away during reinstatement*
Stayed at home during reinstatement work *(please delete as applicable)*

Please give any additional details and reasons for your choice to stay or to leave:
.....
.....

4) **Have you had any difficulties with insurance companies, utilities agencies, contractors?**

(please circle) **Yes / No**

Please give brief details of this:

.....
.....
.....
.....

This study is interested in the impact of flood-related trauma but other traumatic events in your life may also affect your answers to the questionnaires. It is therefore useful for us to know whether you have experienced other traumas as well as the flood.

Have you experienced any trauma **BEFORE the flood**? *(please circle)* **Yes / No**

If yes, please describe the trauma briefly:

.....
.....
.....

Have you experienced any trauma **SINCE the flood**? *(please circle)* **Yes / No**

If yes, please describe the trauma briefly:

.....
.....
.....

Thank you – please complete the next questionnaire.

Discuss consent and anonymity **Might be distressing to talk about events and entitles to withdraw at any point they might wish**	
Clarify any questions before starting	
Enquire about their specific flood experience	
Aspects of events that stood out as being particularly emotional	
What thoughts / images went through mind at these times?	
Significance / meaning of the event to the person at the time / meanings after event	**Meanings pertaining to:** *Loss* *Blocking goals* *Repulsion* *Threat* *Others*
How did they feel at the time – physically and emotionally	**Look out for:** *Sadness* *Anger* *Fear* *Disgust / Shame* *Permutations of all* *Others*
Had vivid thoughts / memories / images about aspects of the event	**Look of for intrusions**
How did they feel when this happened?	**Look out for:** *Sadness* *Anger* *Fear* *Disgust / Shame* *Permutations of all* *Others*
What did these experiences make people want to do	**Look out for avoidance** **Hyperarousal** **Other**
Other things noticed? (symptoms / behaviours / feelings / memories / concerns)	

Appendix 13

Kolmogorov-Smirnov analyses for Carlisle and Morpeth Flooded samples

	Area	CARLISLE			MORPETH		
		Flooded			Flooded		
Subscales		N	KS.test D	Significance	N	KS.test D	Significance
Basic Emotions Scale During Flood (BES1)	**Anger1**	31	0.601	0.863	26	0.595	0.871
	Sadness1	31	0.430	0.993	26	0.650	0.791
	Disgust1	31	1.181	0.123	26	1.143	0.2147
	Anxiety1	31	0.902	0.390	26	0.786	0.568
	Happiness1	31	0.960	0.315	26	1.157	0.137
Basic Emotions Scale After Flood (BES2)	**Anger2**	31	0.609	0.853	26	0.855	0.458
	Sadness2	31	0.615	0.844	26	0.991	0.279
	Disgust2	31	1.470	0.027	26	1.094	0.183
	Anxiety2	31	0.667	0.765	26	0.937	0.344
	Happiness2	31	0.649	0.793	26	0.542	0.930
Impact of Events Scale – Revised (IES-R)	**Avoidance**	31	1.050	0.220	26	0.654	0.785
	Intrusion	31	1.006	0.263	26	0.851	0.464
	Hyperarousal	31	1.255	0.086	26	1.077	0.197
	IES-R	31	1.001	0.269	26	0.646	0.798
Regulation of Emotions Questionnaire (REQ)	**Internal-Dysfunctional**	31	0.938	0.342	26	0.598	0.867
	Internal-Functional	31	0.724	0.671	26	0.881	0.419
	External-Dysfunctional	31	2.000	0.001*	26	1.112	0.169
	External-Functional	31	0.560	0.913	26	0.396	0.998
Trauma Symptom Inventory (TSI)	**Atypical Responses ATR**	31	1.673	0.007	26	1.331	0.058
	Response Level RL	31	1.224	0.100	26	1.708	0.006
	Inconsistent Response INC	31	1.006	0.264	26	0.851	0.463
	Anxious Arousal AA	31	0.727	0.665	26	0.610	0.851
	Depression D	31	0.931	0.352	26	0.736	0.650
	Anger / Irritability AI	31	0.757	0.616	26	0.693	0.722
	Intrusive Experiences IE	31	0.902	0.390	26	0.465	0.982
	Defensive Avoidance DA	31	0.632	0.819	26	0.514	0.954
	Dissociation DIS	31	0.712	0.691	26	1.114	0.167
	Sexual Concerns SC	31	1.074	0.199	26	0.941	0.339
	Dysfunctional Sexual Behaviour DSB	31	1.254	0.051	26	1.879	0.002
	Impaired Self Reference ISR	31	0.869	0.436	26	1.365	0.048

Almost achieved significant difference from normal distribution p<0.001*

	Tension Reduction Behaviour TRB	31	1.343	0.054	26	1.010	0.260

Appendix 14

Skewness / Kurtosis of Carlisle Sample

Normality Testing				**Skewness**			**Kurtosis**		
Measure	Variable	Mean	St.Dev	S	Zskew	Signif p	K	Zkurt	Signif p
Basic Emotions Scale – During Flood	**Anger1**	4.06	1.732	-0.321	-0.237	-	-1.040	-1.267	-
	Sadness1	4.02	1.722	-0.045	-0.107	-	-0.716	-0.872	-
	Disgust1	1.68	0.889	1.020	2.422	<0.05	0.439	0.534	-
	Anxiety1	4.65	1.527	-0.677	-1.608	-	-0.118	0.144	-
	Happiness1	2.73	1.566	1.290	3.064	<0.01	1.361	1.657	-
Basic Emotions Scale – After Flood	**Anger2**	5.02	1.724	1.160	2.755	<0.01	3.703	4.510	<0.01
	Sadness2	3.81	1.621	0.107	0.254	-	-0.302	-0.367	-
	Disgust2	1.55	0.710	1.236	2.935	<0.01	0.510	0.621	-
	Anxiety2	4.73	1.752	-0.505	1.199	-	-0.546	0.665	-
	Happiness2	3.87	1.574	0.196	0.465	-	-0.866	-1.054	-
Impact of Event Scale	**Avoidance**	0.90	0.861	1.015	2.410	<0.05	0.539	0.656	-
	Intrusion	1.01	0.968	0.807	2.066	<0.05	-0.601	-0.732	-
	Hyperarousal	0.84	0.908	1.369	3.251	<0.01	1.295	1.577	-
	IES-R	2.74	2.352	0.781	1.855	-	-0.585	0.712	-
Regulation of Emotion Questionnaire	**Internal-Dysfunctional**	1.94	0.639	0.538	1.277	-	-0.545	-0.663	-
	Internal-Functional	3.13	0.700	0.462	1.097	-	-0.615	-0.749	-
	External-Dysfunctional	1.30	0.218	0.942	2.237	<0.05	0.051	0.621	-
	External-Functional	2.69	0.696	0.120	0.285	-	-0.270	-0.328	-
Trauma Symptom Inventory	**Atypical Responses**	50.94	12.132	2.526	6.00	<0.001	6.398	7.792	-
	Response Level	46.52	9.726	2.931	6.961	<0.001	2.931	14.316	<0.001
	Inconsistent Response	53.26	9.187	0.768	1.824	-	0.768	1.137	-
	Anxious Arousal	52.29	11.391	1.129	2.681	<0.01	1.129	2.084	<0.05
	Depression	52.23	8.980	1.175	2.790	<0.01	1.175	1.644	-
	Anger / Irritability	49.16	8.087	0.817	1.940	-	0.817	0.054	-
	Intrusive Experiences	54.55	12.105	1.536	3.648	<0.001	2.704	3.293	<0.001
	Defensive Avoidance	52.58	9.639	0.684	1.624	-	-0.302	-0.367	-
	Dissociation	57.03	14.197	1.068	2.536	<0.05	1.305	1.589	-
	Sexual Concerns	49.71	8.478	1.756	4.171	<0.001	3.554	4.328	<0.001
	Dysfunctional Sexual Behaviour	45.65	2.229	2.583	6.135	<0.001	7.543	9.187	<0.001
	Impaired Self Reference	54.06	12.220	1.891	4.491	<0.001	5.353	6.520	<0.001
	Tension Reduction Behaviour	47.74	6.623	0.953	2.263	<0.05	-0.655	-0.797	-

Appendix 15

Skewness / Kurtosis of Morpeth Sample

Normality Testing				Skewness			Kurtosis		
Measure	Variable	Mean	St.Dev	S	Zskew	Signif p	K	Zkurt	Signif p
Basic Emotions Scale – During Flood	**Anger1**	4.17	1.634	-0.487	-1.067	-	-0.540	-0.608	-
	Sadness1	3.97	1.960	-0.078	-0.171	-	-1.311	-1.478	-
	Disgust1	2.04	1.173	0.852	1.868	-	-0.250	0.281	-
	Anxiety1	4.82	1.723	-0.674	-1.478	-	-0.366	-0.412	-
	Happiness1	2.47	1.467	0.945	2.072	<0.05	-0.402	-0.453	-
Basic Emotions Scale – After Flood	**Anger2**	4.94	1.287	-0.696	-1.526	-	-0.004	-0.004	-
	Sadness2	4.14	1.831	-0.129	-0.282	-	-1.475	-1.663	-
	Disgust2	2.21	1.473	1.067	2.339	<0.05	0.095	0.107	-
	Anxiety2	5.15	1.600	-0.806	-1.767	-	-0.231	-0.260	-
	Happiness2	3.11	1.434	0.410	0.899	-	0.038	0.042	-
Impact of Event Scale	**Avoidance**	1.40	0.870	0.193	0.423	-	-0.784	-0.985	-
	Intrusion	1.81	0.906	-0.499	-1.094	-	-0.231	-0.260	-
	Hyperarousal	1.62	0.871	-0.375	-0.822	-	-0.268	-0.302	-
	IES-R	4.90	2.421	-0.384	-0.842	-	-0.186	-0.209	-
Regulation of Emotion Questionnaire	**Internal-Dysfunctional**	1.95	0.774	0.037	0.081	-	-0.191	-0.215	-
	Internal-Functional	2.95	0.317	-0.179	-0.392	-	0.438	-0.493	-
	External-Dysfunctional	1.41	0.360	0.607	1.331	-	-0.682	-0.768	-
	External-Functional	2.65	0.794	0.125	0.274	-	-0.657	-0.402	-
Trauma Symptom Inventory	**Atypical Responses**	49.96	9.310	2.428	5.324	<0.001	6.645	7.491	<0.001
	Response Level	44.00	7.574	2.138	4.688	<0.001	4.190	4.723	<0.001
	Inconsistent Response	53.19	9.633	0.716	1.570	-	1.223	1.378	-
	Anxious Arousal	60.88	13.204	0.167	0.366	-	-0.643	-0.724	-
	Depression	59.50	12.153	0.357	0.782	-	-1.220	-1.375	-
	Anger / Irritability	57.69	10.620	0.401	0.879	-	-0.723	-0.815	-
	Intrusive Experiences	56.77	10.328	0.471	1.032	-	-0.595	-0.670	-
	Defensive Avoidance	54.92	9.325	0.468	1.026	-	0.085	0.095	-
	Dissociation	59.38	14.800	1.115	2.445	<0.05	0.525	0.591	-
	Sexual Concerns	50.46	9.017	1.465	3.192	<0.01	1.870	2.108	<0.01
	Dysfunctional Sexual Behaviour	47.23	4.893	2.050	4.495	<0.001	3.342	3.767	<0.001
	Impaired Self Reference	59.00	13.825	1.332	2.921	<0.01	1.550	1.747	-
	Tension Reduction Behaviour	53.96	9.425	0.586	1.285	-	-0.681	0.767	-

Appendix 16

Homogeneity of Variance for both samples

Homogeneity of Variance Testing – Carlisle / Morpeth		**Levene Statistic (based on mean)**		
Measure	Variable	F	df	Signif p
Basic Emotions Scale – During Flood	**Anger1**	0.146	1,50	0.704
	Sadness1	1.789	1,50	0.187
	Disgust1	2.397	1,50	0.128
	Anxiety1	1.012	1,50	0.319
	Happiness1	0.719	1,50	0.400
Basic Emotions Scale – After Flood	**Anger2**	0.246	1,50	0.622
	Sadness2	3.402	1,50	0.071
	Disgust2	15.605	1,50	0.000*
	Anxiety2	0.082	1,50	0.776
	Happiness2	0.679	1.50	0.414
Impact of Event Scale	**Avoidance**	0.000	1,50	0.997
	Intrusion	0.000	1,50	0.993
	Hyperarousal	0.188	1,50	0.666
	IES-R	0.087	1,50	0.770
Regulation of Emotion Questionnaire	**Internal-Dysfunctional**	0.263	1,50	0.610
	Internal-Functional	14.820	1,50	0.000*
	External-Dysfunctional	10.258	1,50	0.002
	External-Functional	0.143	1,50	0.707
Trauma Symptom Inventory	**Atypical Responses**	0.863	1,50	0.357
	Response Level	0.197	1,50	0.659
	Inconsistent Response	0.140	1,50	0.709
	Anxious Arousal	0.478	1,50	0.492
	Depression	6.273	1,50	0.016
	Anger / Irritability	4.463	1,50	0.040
	Intrusive Experiences	0.297	1,50	0.588
	Defensive Avoidance	0.541	1,50	0.465
	Dissociation	0.068	1,50	0.497
	Sexual Concerns	1.382	1,50	0.245
	Dysfunctional Sexual Behaviour	4.071	1,50	0.049
	Impaired Self Reference	0.874	1,50	0.354
	Tension Reduction Behaviour	3.484	1,50	0.068

Appendix 17
Hypothesis 2 a)

Independent samples t-tests comparing emotions during flooding: Carlisle versus Morpeth

Measure	Group	Mean	S.D.	T	df	Signif
Anger	Carlisle Morpeth	4.77 4.87	1.55 1.33	-0.353	93	0.725
Sadness	Carlisle Morpeth	4.55 4.48	1.67 1.86	0.187	93	0.852
Disgust	Carlisle Morpeth	2.16 2.69	1.02 1.26	-2.241	93	0.027*
Anxiety	Carlisle Morpeth	4.97 5.04	1.54 1.73	-0.198	93	0.844
Happiness	Carlisle Morpeth	2.63 2.85	1.29 1.52	-0.761	93	0.449

* not significant for adjusted alpha level (0.05 / 5) = 0.01

Appendix 18

Hypothesis 2 b)

Independent samples t-tests comparing emotions after flooding: Carlisle versus Morpeth

Measure	Group	Mean	S.D.	T	df	Signif
Anger	Carlisle	5.13	1.69	-0.862	93	0.391
	Morpeth	5.38	1.16			
Sadness	Carlisle	4.00	1.57	-2.144	93	0.035*
	Morpeth	4.73	1.69			
Disgust	Carlisle	1.78	0.71	-4.915	93	0.000**
	Morpeth	3.11	1.641			
Anxiety	Carlisle	4.92	1.67	-1.383	93	0.170
	Morpeth	5.35	1.39			
Happiness	Carlisle	3.72	1.51	1.703	93	0.092
	Morpeth	3.18	1.55			

* not significant for adjusted alpha level (0.05 / 5) = 0.01 ** significant for adjusted alpha level (0.05 / 4) = 0.01

Paired samples t-tests comparing emotions before flooding with emotions after flooding: Carlisle and Morpeth

Measure	Mean	S.D.	T	df	Signif
Anger 1	4.82	1.44	-1.775	94	0.079
Anger 2	5.09	1.44			
Sadness 1	4.51	1.76	2.54	94	0.013
Sadness 2	4.13	1.66			
Disgust 1	2.43	1.17	2.366	94	0.020
Disgust 2	2.15	1.32			
Anxiety 1	5.01	1.63	-0.057	94	0.955
Anxiety 2	5.02	1.62			
Happiness 1	2.74	1.41	-0.684	94	0.000**
Happiness 2	3.54	1.54			

** significant for adjusted alpha level (0.05 / 5) = 0.01

Appendix 19
Hypothesis 3a)
Independent samples analysis of variance comparing flood-related measures

i) Flooded 3 feet or less versus flooded 3 feet or more: Morpeth

Measure	Group	Mean	S.D.	F	df	Signif
Anger 1	< 3 feet	3.96	1.63	2.227	1,21	0.151
	> 4 feet	4.96	1.31			
Sadness 1	< 3 feet	4.15	2.10	0.077	1,21	0.784
	> 4 feet	3.90	1.79			
Disgust 1	< 3 feet	2.01	1.30	0.102	1,21	0.752
	> 4 feet	1.85	0.81			
Anxiety 1	< 3 feet	4.93	1.80	0.301	1,21	0.589
	> 4 feet	4.50	1.80			
Happiness 1	< 3 feet	2.00	1.07	4.063	1,21	0.057
	> 4 feet	3.21	1.84			
Anger 2	< 3 feet	4.75	1.49	1.234	1,21	0.279
	> 4 feet	5.40	0.99			
Sadness 2	< 3 feet	3.93	2.01	0.674	1,21	0.421
	> 4 feet	4.62	1.72			
Disgust 2	< 3 feet	2.42	1.62	2.443	1,21	0.133
	> 4 feet	1.47	0.74			
Anxiety 2	< 3 feet	5.01	1.75	0.004	1,21	0.951
	> 4 feet	5.06	1.55			
Happiness 2	< 3 feet	2.63	1.33	1.748	1,21	0.200
	> 4 feet	3.37	1.16			
Avoidance	< 3 feet	1.35	0.87	0.017	1,21	0.898
	> 4 feet	1.40	0.78			
Intrusion	< 3 feet	1.59	0.99	2.055	1,21	0.166
	> 4 feet	2.17	0.76			
Hyperarousal	< 3 feet	1.40	0.94	1.246	1,21	0.277
	> 4 feet	1.85	0.82			
TSI mean	< 3 feet	53.74	7.30	1.109	1,21	0.324
	> 4 feet	57.28	9.26			

ii) Left home during flood versus stayed: Morpeth

Measure	Group	Mean	S.D.	F	df	Signif
Anger 1	Left	4.48	1.23	0.390	1,21	0.539
	Stayed	4.05	2.05			
Sadness 1	Left	4.50	2.00	1.812	1,21	0.193
	Stayed	3.38	1.81			
Disgust 1	Left	1.85	1.16	0.262	1,21	0.614
	Stayed	2.11	1.16			
Anxiety 1	Left	5.25	1.55	1.665	1,21	0.118
	Stayed	4.05	1.94			
Happiness 1	Left	2.41	1.46	0.003	1,21	0.959
	Stayed	2.44	1.57			
Anger 2	Left	5.08	1.35	0.231	1,21	0.636
	Stayed	4.80	1.42			
Sadness 2	Left	4.30	2.00	0.458	1,21	0.506
	Stayed	3.83	1.81			
Disgust 2	Left	2.05	1.50	0.025	1,21	0.877
	Stayed	2.15	1.40			
Anxiety 2	Left	5.10	1.91	0.070	1,21	0.791
	Stayed	4.91	1.22			
Happiness 2	Left	2.98	1.04	0.167	1,21	0.687
	Stayed	2.75	1.69			
Avoidance	Left	1.16	0.72	2.343	1,21	0.014
	Stayed	1.69	0.91			
Intrusion	Left	1.83	0.79	0.052	1,21	0.822
	Stayed	1.73	1.19			
Hyperarousal	Left	1.53	0.80	0.037	1,21	0.849
	Stayed	1.60	1.11			
TSI mean	Left	56.73	7.24	1.782	1,21	0.196
	Stayed	52.24	8.80			

iv) Insurance difficulties versus no insurance difficulties: Morpeth

Measure	Group	Mean	S.D.	F	df	Signif
Anger 1	Problems None	4.43 4.09	1.67 1.45	0.234	1,21	0.634
Sadness 1	Problems None	4.20 3.81	1.96 2.08	0.195	1,21	0.663
Disgust 1	Problems None	1.84 2.17	1.15 1.15	0.437	1,21	0.516
Anxiety 1	Problems None	4.95 4.46	1.62 2.11	0.372	1,21	0.548
Happiness 1	Problems None	2.40 2.46	1.55 1.41	0.011	1,21	0.918
Anger 2	Problems None	5.25 4.46	0.98 1.84	1.793	1,21	0.195
Sadness 2	Problems None	4.53 3.50	1.75 2.12	1.565	1,21	0.225
Disgust 2	Problems None	1.94 2.37	1.23 1.80	0.453	1,21	0.508
Anxiety 2	Problems None	5.40 4.34	1.17 2.22	2.265	1,21	0.147
Happiness 2	Problems None	2.88 2.90	1.14 1.65	0.002	1,21	0.969
Avoidance	Problems None	1.52 1.09	0.81 0.82	1.449	1,21	0.242
Intrusion	Problems None	2.06 1.28	0.71 1.16	4.099	1,21	0.056
Hyperarousal	Problems None	1.76 1.18	0.71 1.15	2.197	1,21	0.153
TSI mean	Problems None	57.10 50.98	7.23 8.32	3.369	1,21	0.081

Change over time: Carlisle versus Morpeth

Measure	Group	Mean	S.D.	F	df	Signif
Avoidance	Morpeth	1.69	0.76	2.745	1,55	0.103
	Carlisle	1.33	0.83			
Intrusion	Morpeth	2.28	0.66	6.382	1,55	0.014*
	Carlisle	1.73	0.97			
Hyperarousal	Morpeth	2.07	0.68	6.661	1,55	0.013*
	Carlisle	1.56	0.79			
TSI mean	Morpeth	57.74	7.24	6.347	1,55	0.015*
	Carlisle	53.09	5.88			

* significant at 0.05